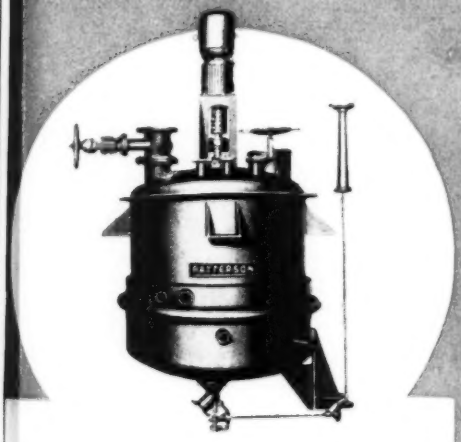
THE PAPER INDUSTRY
and PAPER WORLD
N EDUCATIONAL NEWS MAGAZINE—DECEMBER, 1948

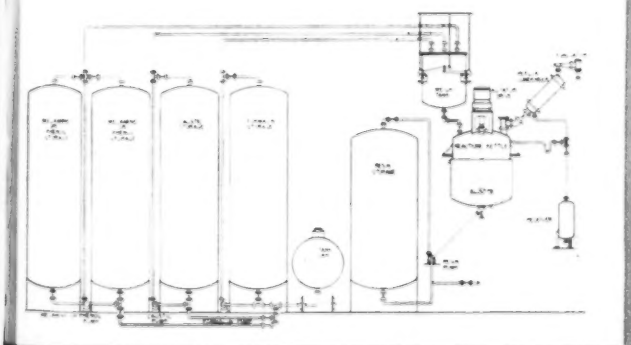
TECHNOLOGY DEPARTMENT

Planning your own Resin Manufacture?



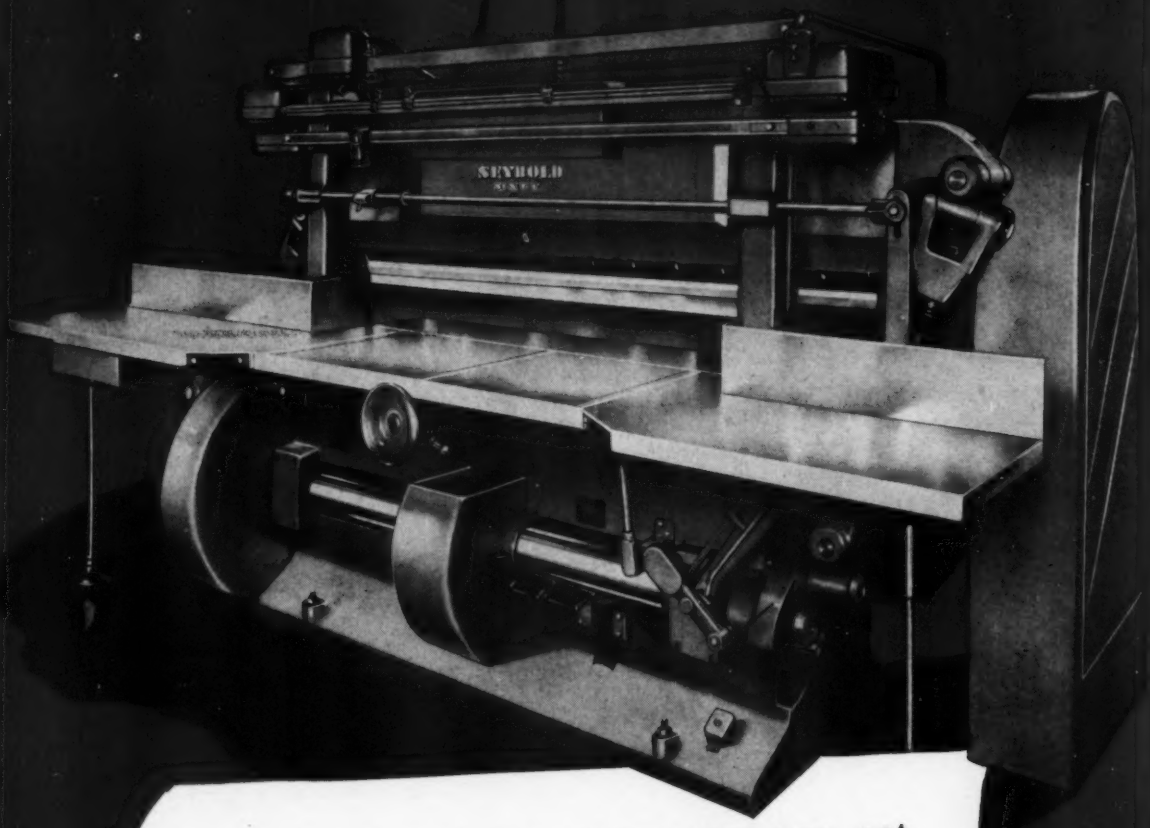
COME TO *Headquarters*
FOR PROFITABLE CONSULTATION
AND THE RIGHT PROCESS EQUIPMENT!

Patterson
Synthesizing Systems



Joining in the industry's move to include resin manufacture as part of paper mill operation? Let's give you facts and figures—we know both fields well!

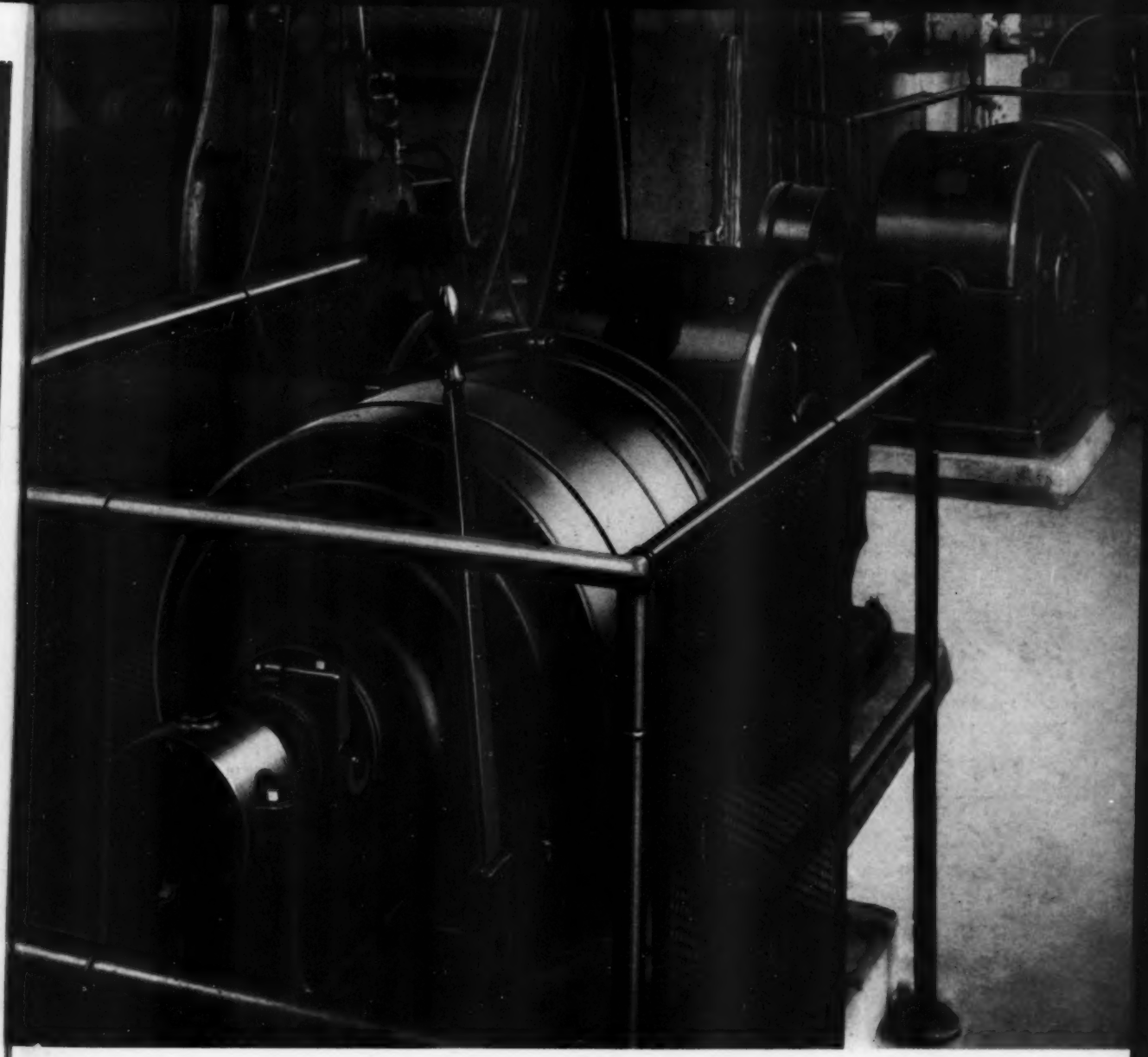
The Patterson Foundry and Machine Co.
East Liverpool, Ohio, U. S. A.
The Patterson Foundry and Machine Co., (Canada) Ltd.
Toronto, Canada



INCREASED MACHINE TONNAGE may not necessarily mean that you must increase the number of trimmers in your finishing room to keep production in balance. Some mills are learning this: *With new Seybold "Sixty" Spacer-Trimmers on the job, actually fewer trimmers are needed to handle more work! And valuable floor space is saved, too.* It will pay you to investigate production records being established by Seybold "Sixty" Mill Spacer-Trimmers.

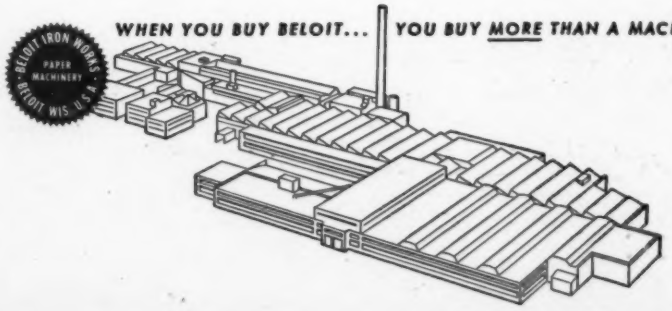
HARRIS-SEYBOLD

General Offices—Cleveland 5, Ohio



Quiet gear drives, fully enclosed

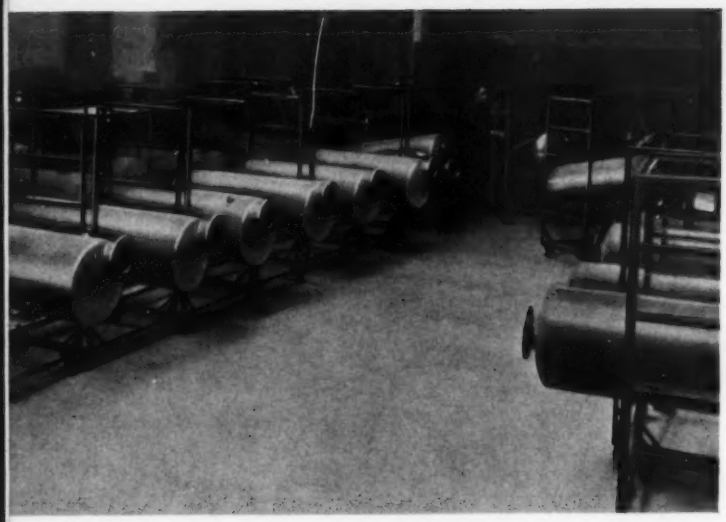
These Beloit drive units recently were installed in the Hummel and Downing Paper Co. plant, Milwaukee, to replace open-type mortise gear drives. Replacing old units, these drives clean up the back of the machine, save up to 15% in power, and result in definite savings in maintenance cost and down time. They are available with mechanical or air-operated clutches. —*Beloit Iron Works, Beloit, Wisconsin.*



WHEN YOU BUY BELOIT... YOU BUY MORE THAN A MACHINE!

BELOIT

PAPER MACHINERY



Water-cooled diesel engine exhaust mufflers are coated on the interior and exterior with Heresite.

HERESITE

REG. U. S. PATENT OFFICE

SYNTHETIC PROTECTIVE COATINGS:

Baking Type
Self-Curing Type

HERECROL

REG. U. S. PATENT OFFICE

SYNTHETIC RUBBER:

Lining in sheet form
Liquid Coating applied by spray or dip

PIONEERS in formulating and applying protective linings and coatings for industrial applications. Our knowledge and practical experience embrace 25 years in the development of corrosion resistant materials and their application by thoroughly trained personnel and by tried and proven methods that assure maximum results.

Above materials are available to industry for application in their own plants to protect steel equipment from corrosion.

Pipes lined with Heresite Synthetic Rubber Coating are impervious to most chemicals and may be used for conveying corrosive solutions.

In addition to our own Coating Department in our plant at Manitowoc, custom coating work is done at the following plants which maintain modern coating facilities:

GENERAL COATING COMPANY	405 Main Street, Woodbridge, New Jersey
TUBE-KOTE INC.	2520 Holmes Road, Houston 4, Texas
SOC-CO PLASTIC COATING COMPANY .	3534 E. 22nd Street, Los Angeles 23, California
DOMINION RUBBER COMPANY LTD.	Montreal, Canada

Latest Heresite booklet will be mailed on request.

HERESITE & CHEMICAL COMPANY - Manitowoc, Wisconsin

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SUTHERLAND

Problem Power costs aren't what they used to be with the mounting costs of fuel, so to safeguard profits you must wring the last pound of refined stock out of every kw.

Solution Sutherlands! Why? They give you more return in quality stock per dollar of power. Invest your power dollars wisely.

• • •

SUTHERLAND *Continuous* BEATING AND REFINING SYSTEM

SUTHERLAND REFINER CORPORATION

TRENTON, NEW JERSEY — *Manufactured in the United States by Valley Iron Works Co., Appleton, Wisconsin*

Sutherland Refiner Limited, 319 Drummond Building, Montreal, P. Q.

The production of steel plate structures for the paper industry calls for special processes, such as stress relieving and x-raying to meet ASME code requirements. The view above shows the type of stress-relieving equipment which has been installed in our plants, and it indicates the large scale of the jobs we are prepared to undertake.

We build all types of steel plate work for paper mills, both shop-built and field-erected, depending on the size of the structures. Some of these include flat-bottom and cone-bottom tanks, diffusers, elevated water tanks, and Marx Savealls. When specified, tanks and pressure vessels are supplied with non-corrosive linings.

We'll be glad to give you complete information and quotations on the steel plate work you need. Send your specifications to our nearest office.

Above: A 12-ft. diam. by 45-ft. 4-in. sulphate digester leaving the stress relieving furnace at our Birmingham, Ala., plant. This shop-built digester is one of a group of four shipped to the St. Joe Paper Company at Port St. Joe, Fla.

CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3	2143 Healey Building	Detroit, 26	1566 Lafayette Building	Philadelphia, 3	1653-1700 Walnut Street Building
Birmingham, 1	1511 North 50th Street	Havana	402 Abreu Building	Salt Lake City, 1	1527 First Security Bank Building
Boston, 10	1026-201 Devonshire Street	Houston, 2	2143 National Standard Building	San Francisco, 11	1217-22 Battery Street Building
Chicago, 4	2445 McCormick Building	Los Angeles, 14	1459 Wm. Fox Building	Seattle, 1	1327 Stuart Building
Cleveland, 15	2267 Guildhall Building	New York, 6	3350-165 Broadway Building	Tulsa, 3	1651 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

THE PAPER INDUSTRY and PAPER WORLD

(Reg. U. S. Pat. Off.)

VOLUME 30 - - - - DECEMBER, 1948 - - - - NUMBER 9

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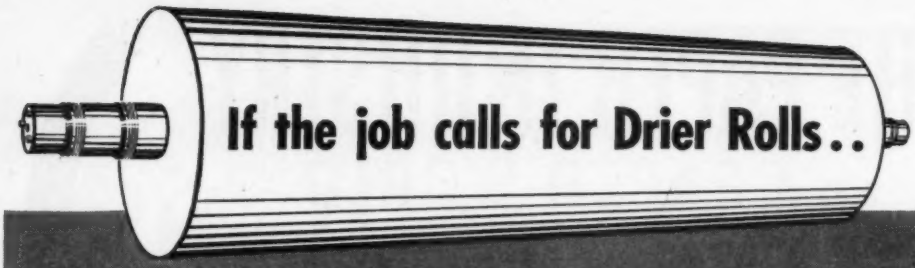


If the job calls for Drier Rolls..

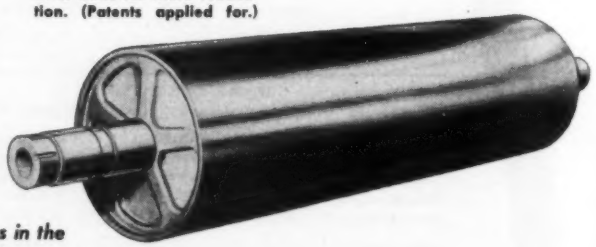
Hundreds* of Lukenweld Jacketed Steel Drier Rolls are doing it *better, faster and safer*

Over 14 years' experience on drying problems goes into Lukenweld's engineering of rolls and machines for drying. In scores of plants, hundreds of Lukenweld Jacketed Steel Drier Rolls in service today demonstrate these advantages: *Higher quality products*—surface temperatures are more uniform and constant. *Faster production*—positive scavenging of steam passages flushes out air and condensate, assuring high efficiency. *Greater safety*—welded steel plate construction permits high steam pressures. *Simplicity of construction*—nothing to get out of order; can be designed without bolts, nuts, or siphons to work loose in service.

Any diameter, 24 inches or 18 feet—lengths to suit each task—plain steel, polished or plated surfaces, or any of the Lukens corrosion-resistant clad steels; we design drier rolls to meet your exact requirements. Lukenweld also designs and builds additions to existing drying equipment or completely new machines.

Bulletin 358 tells about Lukenweld Jacketed Drier Rolls. For a copy, write Lukenweld, Division of Lukens Steel Company, 408 Lukens Building, Coatesville, Pa.

Employ Lukenweld Jacketed Drier Rolls for More Production. (Patents applied for.)



**In service in scores of plants on drying operations in the paper, chemical, drug, food, plastic and other industries.*

LUKENS
LUKENWELD DIVISION

DESIGNERS, ENGINEERS AND MANUFACTURERS OF MACHINERY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

Announcing

100,000 TONS A YEAR
MORE DISSOLVING PULP

We take pleasure in announcing that we will have available 100,000 tons a year more dissolving pulp for our customers.

This additional tonnage will be provided from a new mill in the southern United States due to be brought into production early in 1950 by International Paper Company.

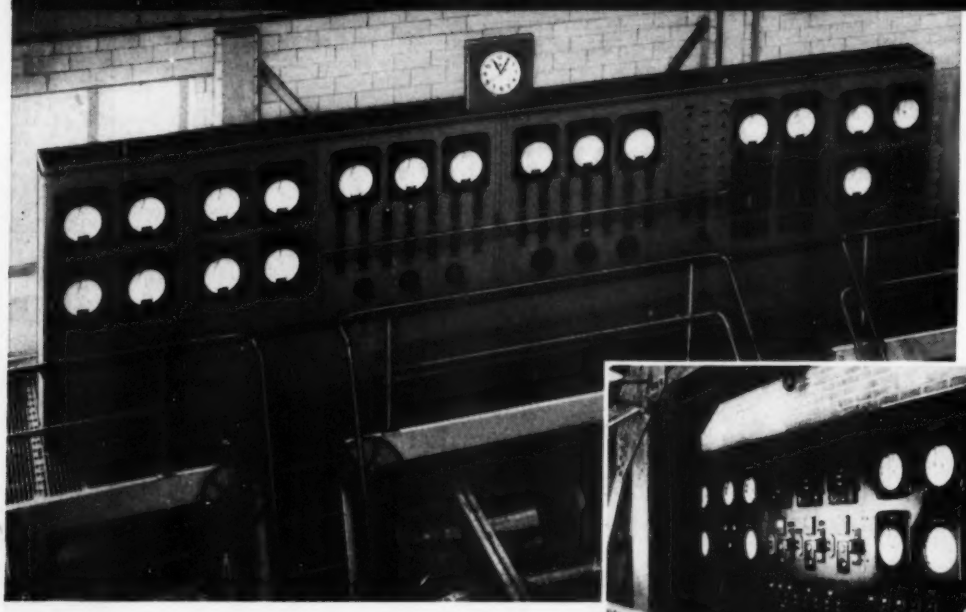
Technical services to our customers on this new tonnage will be provided as heretofore by Industrial Cellulose Research Limited, Hawkesbury, Ontario, Canada.

RIORDON
Sales Corporation Limited

SUN LIFE BUILDING MONTREAL, CANADA

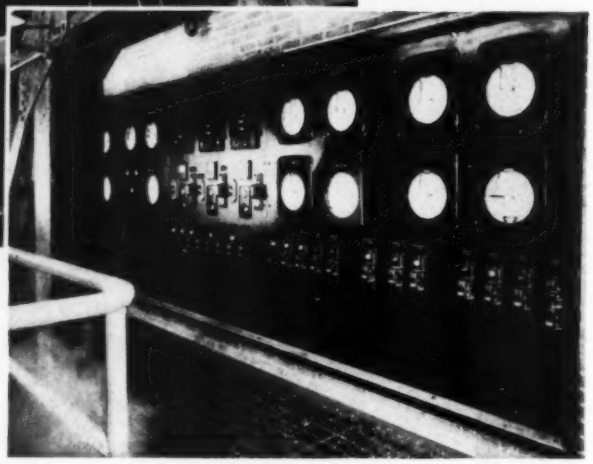
Tenacell · *Novocell* · *Plasticell* · *Phanecell*

for CLEANER PULP . . . GREATER CHEMICAL RECOVERY . . . EASIER OPERATION . . . and TOP EFFICIENCY



◀ *Left: one of the latest Foxboro pulp washer control systems . . . in a new kraft mill.*

▼ *Below: another Foxboro installation . . . with a long and successful record of operation . . . in one of the world's largest pulp mills.*



. . . install FOXBORO Pulp Washing Control

• Cleaner, more uniformly washed pulp, *plus* greater chemical recovery are yours with a Foxboro Control System on the job. Equally important are the lighter work load for your operators, and the smoother, more efficient functioning of your equipment, when the major variables are controlled by Foxboro Instrumentation.

Here's what you get with this Foxboro engineered pulp washer control . . .

1 *A record of blow tank level.*

2 *Uniformly-controlled consistency of pulp from blow tank.*

3 *Controlled flow of pulp from blow tank with an accurate record for accounting purposes.*

4 *Controlled flow of hot water and liquor to showers of each washer.*

5 *A record of level in each filtrate tank.*

6 *Controlled addition of water to washed stock . . . thus assuring more uniform consistency in washed stock chest. Also, a record of stock chest level.*

7 *A record of flow and density of liquor to evaporator.*

This Foxboro system conveniently centralizes pulp washer control in a compact, modern cabinet . . . greatly simplifying installation, operation and servicing. Except for simple external connections, all piping and wiring is expertly engineered at Foxboro.

Consider the advantages of this instrumentation for your mill. Whatever the make of your washing equipment, IMPCO, OLIVER, SWENSON-NYMAN . . . there's a Foxboro control system designed especially for it. Similar Foxboro systems are helping to maintain top washing efficiency in mills throughout the U. S. and Canada. Several have been in operation over 10 years. Write for complete information. **The Foxboro Company, 158 Neponset Ave., Foxboro, Mass., U. S. A.**

FOXBORO Engineered CONTROL

REG. U. S. PAT. OFF.

1. PURE DISTILLED WATER has no dissolved solids; produces big steam bubbles that burst instantly at surface as shown in Nalco Laboratories test tube boiler.

2. BOILER WATER has high dissolved solids; small bubbles with foaming tendencies cause carryover and impure steam.

3. BOILER WATER WITH NALCO ANTIFOAM Treatment —same water as in Photo No. 2 —now produce large bubbles without foam and pure steam ...the same results as distilled water.

Photos in Nalco Laboratories — unretouched.

WITH Nalco ANTIFOAM TREATMENT

NALCO Antifoam Chemicals, used as a part of Nalco System Water Treatment, consistently produce steam with only 1 to 3 parts per million solids content — and frequently permit more than double the dissolved solids in the boiler water without danger of carryover!

Truly dry steam is a welcome and valuable protection for turbines, pumps, and the entire steam system ...and Nalco Antifoam Treatment makes a simpler problem of control of boiler water dissolved solids, since it prevents carryover at concentrations far exceeding average practices.

Your Nalco Representative can show you copies of actual steam quality charts that are typical of the *before* and *after* performance of Nalco Antifoam Treatments — *but the best proof is in your own boilers* ... Call or write, today.

. . . and PRECISION-CONTROLLED BLOWDOWN

● Precision control of boiler blowdown is assured with the Nalco Meterblo Valve...Large, easy-to-read settings ... quick-opening and closing...can be mounted in 16 different positions without special fittings. Now available through your Nalco Representative . . . or write direct.

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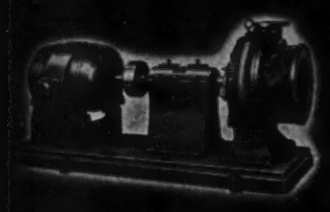
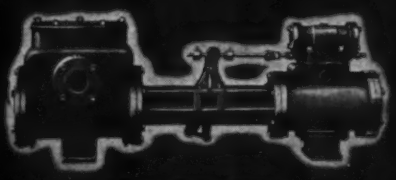
Nalco SYSTEM • Serving Industry through Practical Applied Science

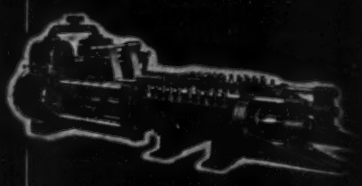
Warren Stock Pump
Type 5-SOD-15 . . . 12" suction nozzle



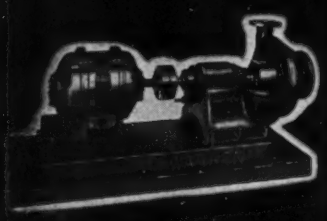


Warren Steam Heat
Vacuum Pump

Warren Horizontal Duplex
Hydraulic Pump



WARREN PUMPS



Warren Type "L" Single-Stage
Single-Suction Liquor Pump

Maintain efficiency
Operate at low cost
Are long-lived

CENTRIFUGAL

Single and multi-stage
Pressure range: 0 to 1200 P. S. I.
Capacities: 0 to 50,000 G. P. M.
Types: Horizontal and Vertical
Impellers: Open or enclosed
Casings: Horizontal or Vertical Split, cast iron or bronze
Bearings: Sleeve or ball-bearing

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Single and Duplex Outside Packed Plunger
Single, Duplex and Compound Hydraulic
Steam Heat Vacuum
Automatic Pump and Receiver, etc., etc.,

Send your pumping problem to us; our Engineers will recommend the right pump for the job.

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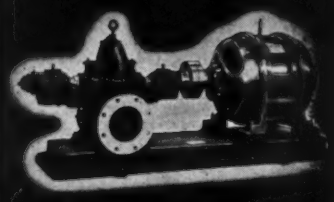
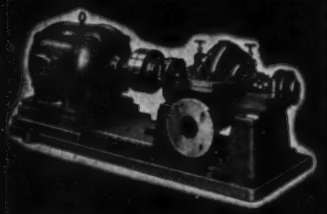
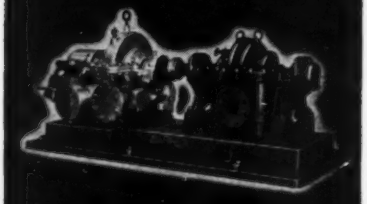


Warren Double Suction Pump
Single Stage



Warren Type DBL, Single-Stage
Double Suction, Centrifugal Pump

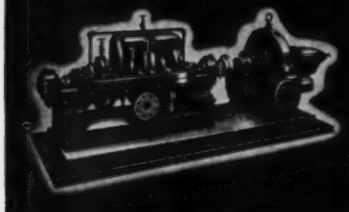


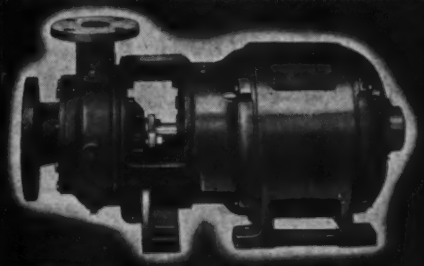
Warren Two-Stage Volute
Centrifugal Pump

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS

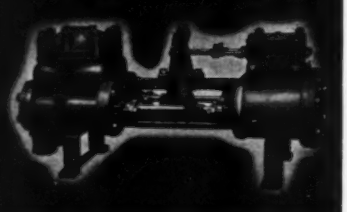
Warren Type TM, 4 and 6 Stage
Centrifugal Pump





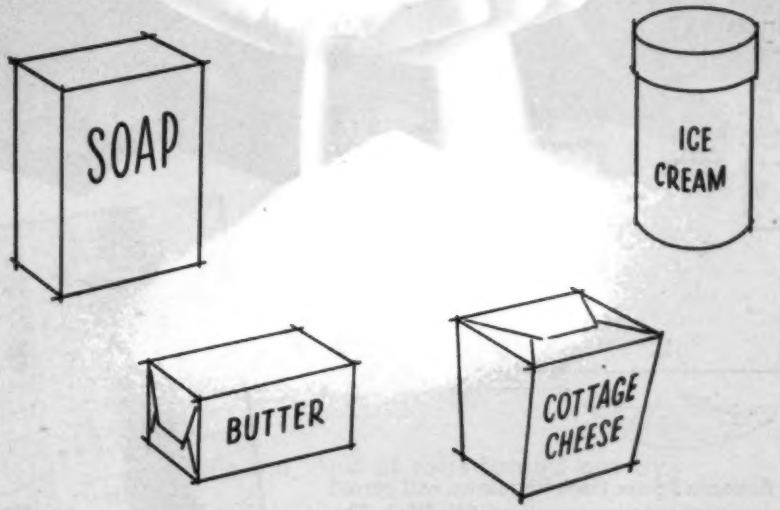
Warren "Compacunit"—4 Types—42 Sizes

Warren Horizontal "Realwear"
Duplex Piston Pump



in paper and paperboard coatings

the trend is to HERCULES CMC



Steadily increasing commercial applications and continuing mill trials demonstrate that calender-applied Hercules* CMC produces 5 to 20 per cent increases in Mullen and tensile strength on paper and board.

Effective grease resistance also can be obtained with Hercules CMC, using calender boxes and size press. In most cases, calender-applied CMC achieves sufficient grease resistance for high quality gloss ink printing and/or substantial wax savings.

Hercules CMC, cellulose gum, is a white, free-flowing, water soluble, granular powder, available in a wide range of viscosities. It is supplied in 100 lb. fiber drums and 50 lb. bags. For technical details and prices, write:

HERCULES

SIZING MATERIALS AND CHEMICALS FOR PAPER

HERCULES POWDER COMPANY

961 King Street, Wilmington 99, Delaware

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PREVENT

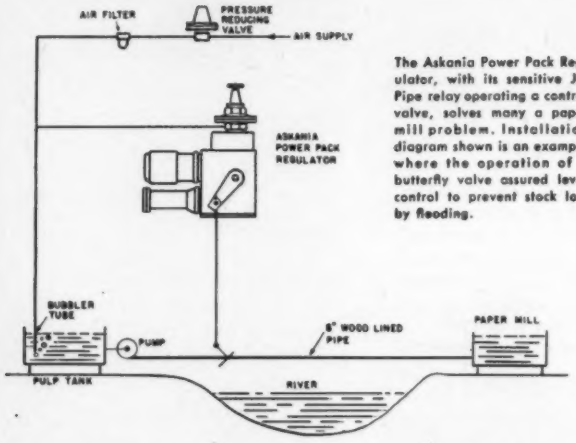
TANK OVERFLOW

STOCK WASTE

MOTOR OVERLOAD

WITH

ASKANIA LEVEL CONTROL



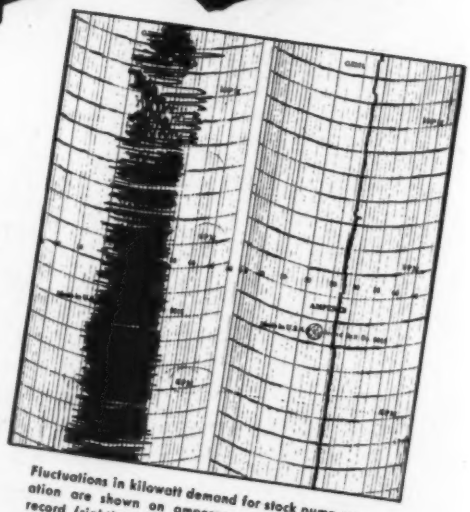
The Askania Power Pack Regulator, with its sensitive Jet Pipe relay operating a control valve, solves many a paper mill problem. Installation diagram shown is an example where the operation of a butterfly valve assured level control to prevent stock loss by flooding.

The sensitivity of the Askania Power Pack Regulator will permit level control with an accuracy of plus or minus .01" W.C. The Regulator is a self-contained, completely packaged unit.

With the exclusive Askania Jet Pipe relay operating a control valve in the stock line, the flow is controlled with extreme accuracy to solve the problems of flooding, stock waste and motor overload.

At one mill, difficulty had been experienced in regulating rate of pulp flow with rate of production. With the pulp mill on one side of a river and the paper mill on the other, there was a stock loss by overflow at both ends of the line. Askania Level Control was the practical answer.

If you have a similar problem, send for Bulletin 139.



Fluctuations in kilowatt demand for stock pump operation are shown on amperage record (left) while record (right) indicates how Askania Level Control prevented overloading of stock pump motor.

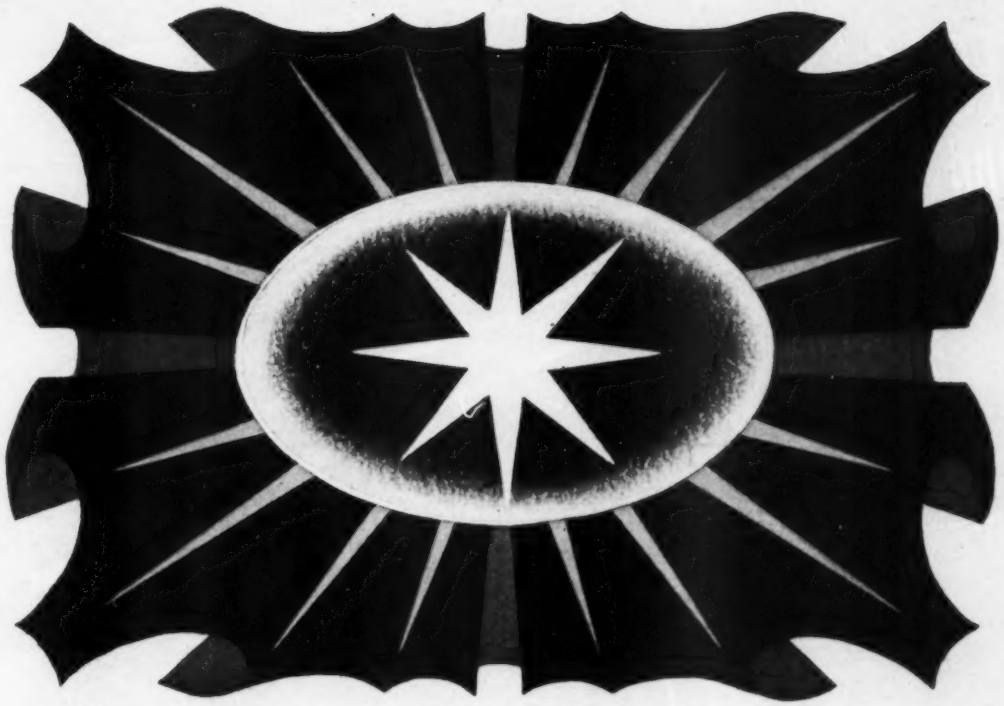
IN CANADA . . . Askania is represented in the pulp and paper industries by Sherbrooke Machineries, Ltd., with main offices and plant in Sherbrooke, Quebec. Sales offices are in Montreal, Vancouver

ASKANIA Controls

ASKANIA REGULATOR COMPANY

A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION

240 EAST ONTARIO STREET — CHICAGO 11, ILLINOIS

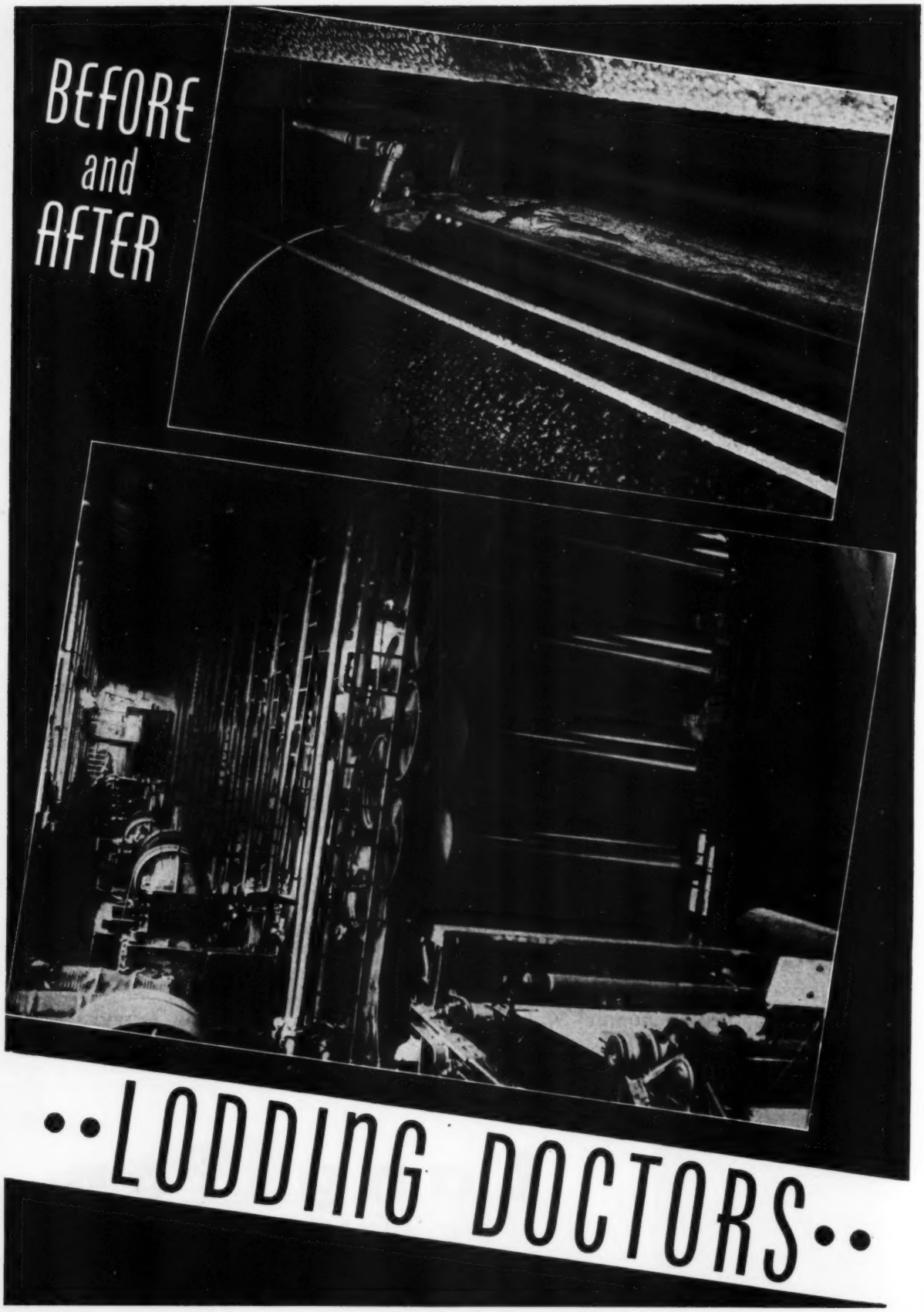


Gem quality

That's the kind of rolls turned out by
Langston Slitters and Winders.
Dense, square-edged—cut clean and true.
There is a type and size for every need.
Samuel M. Langston Company, Camden, New Jersey.

Langston

SLITTERS AND ROLL WINDERS


BEFORE
and
AFTER
••LODDING DOCTORS••

TENAX FELTS ARE ECONOMICAL

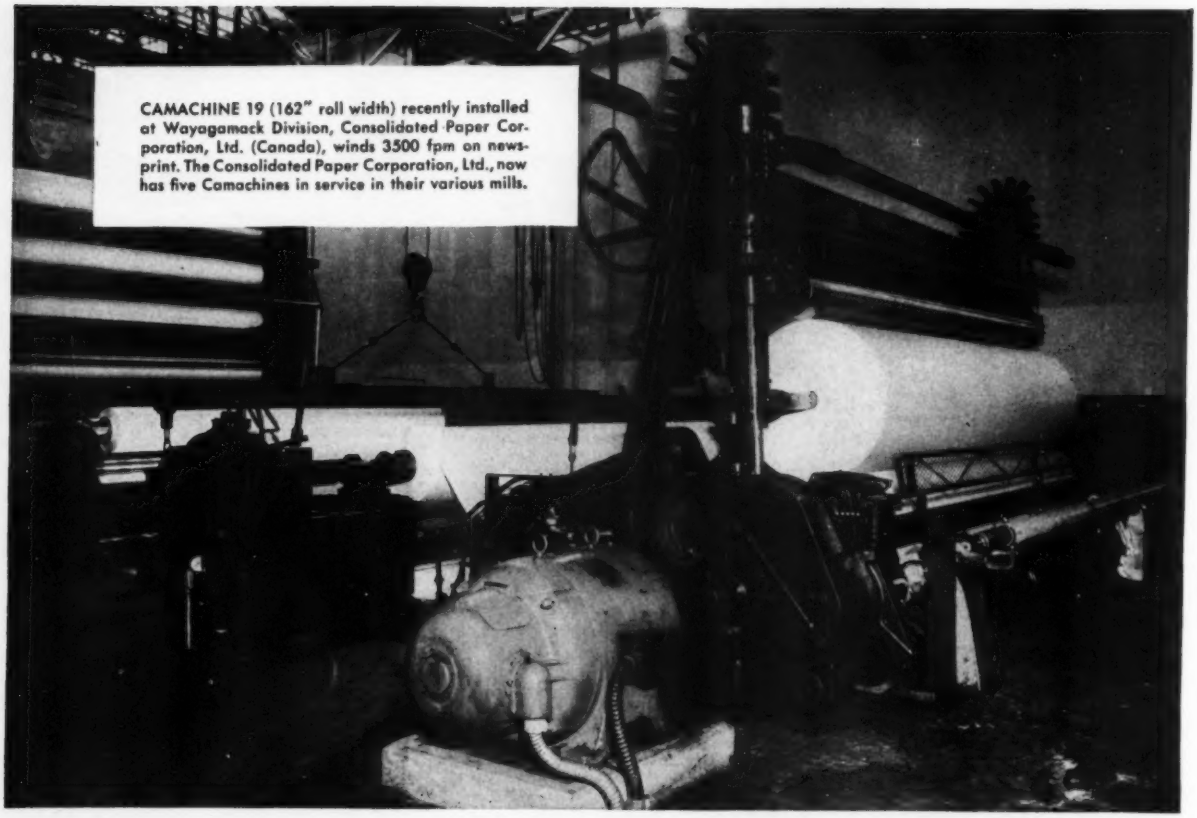
SERVING THE PAPER INDUSTRY SINCE 1891

Our research and development is paying off for our customers in longer service and lower costs. If you would share in these advantages we suggest you afford us the opportunity of serving you.

LOCKPORT FELT COMPANY • NEWFANE, NEW YORK

Camachines

...for top roll-winding efficiency at amazing high speeds



CAMACHINE 19 (162" roll width) recently installed at Wayagamack Division, Consolidated Paper Corporation, Ltd. (Canada), winds 3500 fpm on newsprint. The Consolidated Paper Corporation, Ltd., now has five Camachines in service in their various mills.

CAMACHINES, the world over, are keeping well ahead of the pace set by the fastest paper mills . . . producing top-quality shipping rolls of news, book, kraft and paper-board at speeds up to 5000 fpm on newsprint.

Clean-cut, wrinkle-free Camachine rolls, wound to uniform density from core to circumference, give smooth performance on the fastest of web printing presses and processing machines. Exclusive Camachine pneumatic web tension assures constant automatic control of the roll density even at the highest winding speeds.

Other exclusive new Camachine engineering features which are optional on the big mill-type Camachines are: the pneumatic brake on drive and idler roll; push-button controlled motor-driven riding-roll lift and roll ejector; and pneumatically controlled pressure on the cutter wheels and cutter spacer bar.

Write for illustrated literature on modern Camachine slitting and roll-winding equipment for all paper mill and converting plant requirements.

Cameron Machine Company, 61 Poplar St., Brooklyn 2, N.Y.

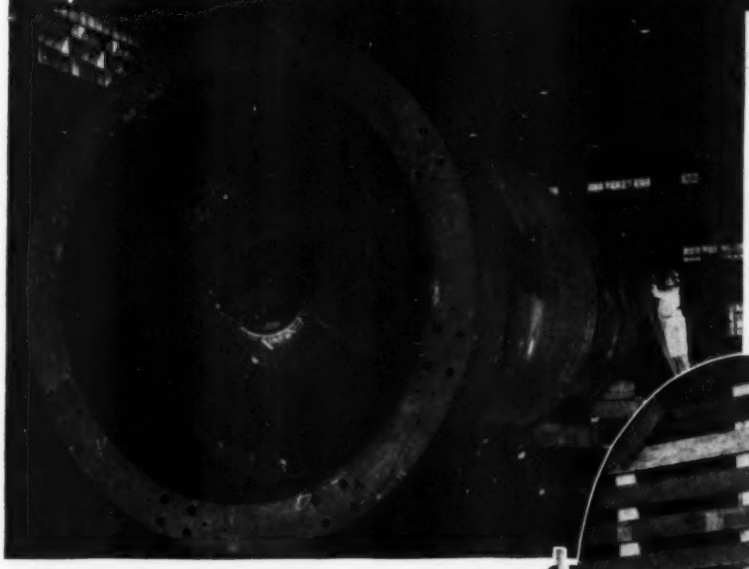
Camachines
FOR FAST, TOP QUALITY ROLL PRODUCTION
...the world over

VESSEL DIVISION

NEWS

A. O. SMITH Corporation

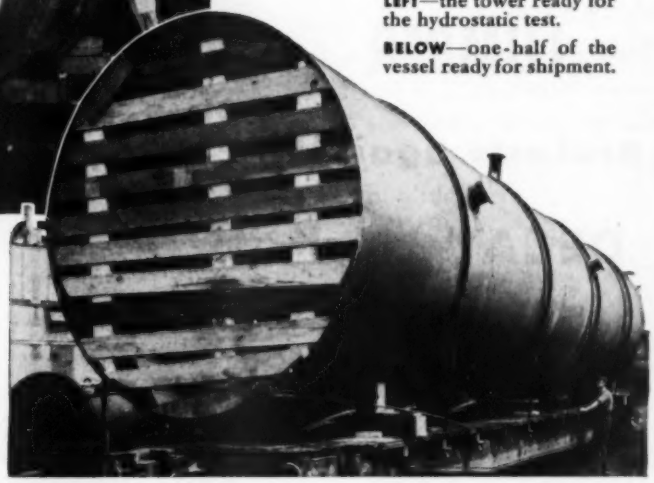
New York 17 • Philadelphia 5 • Pittsburgh 19 • Atlanta 3 • Chicago 4
Tulsa 3 • Houston 2 • Seattle 1 • Los Angeles 14
International Division: Milwaukee 1



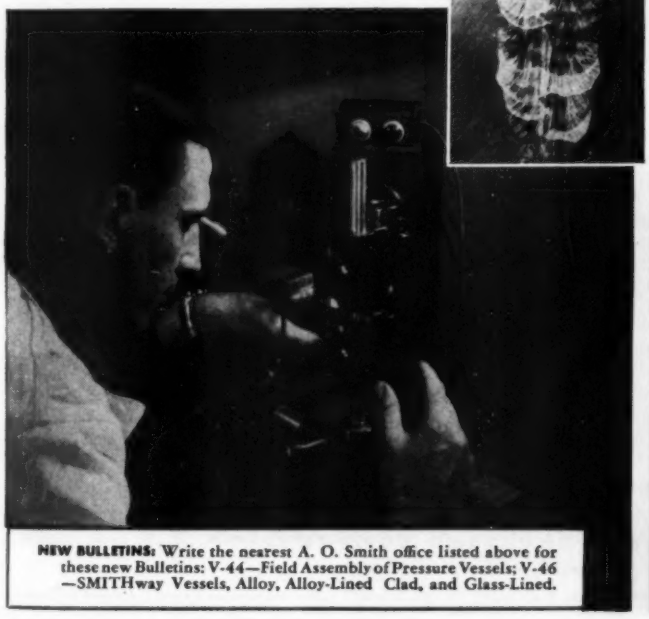
A. O. SMITH TAKES THE GUESS WORK OUT OF FIELD ASSEMBLY. Railroad shipping restrictions made it necessary to field-assemble this 11½ ft. dia. x 116 ft. long SMITHlined Fractionating Tower. To insure ease of assembly in the field, it was first manufactured and completely assembled in the A. O. Smith Milwaukee Plant, then hydrostatically tested, cut in two at the center girth seam, rescarfed for welding in the field, and shipped. Field-assembly costs were cut to a minimum with only one girth seam to be welded.

LEFT—the tower ready for the hydrostatic test.

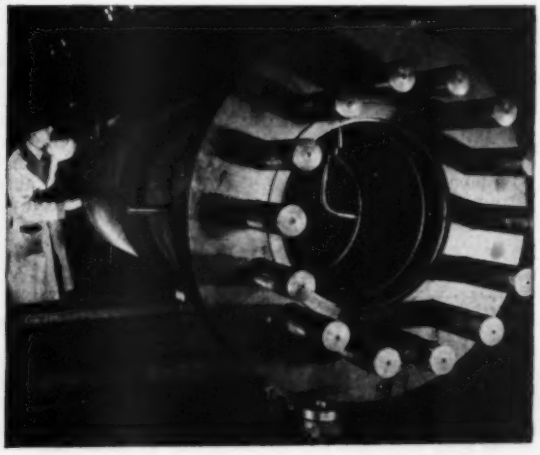
BELOW—one-half of the vessel ready for shipment.



MANY TESTS BEYOND CODE REQUIREMENTS are a regular part of A. O. Smith vessel production control procedures. Here Bill Poehlman, a 20-year veteran, in charge of spectroscopy and X-Ray research, checks the deposited weld metal composition in a vessel test plate, by means of an A. O. Smith-developed microspectrographic technique.



IN STOCKHOLM, SWEDEN, they know about the famous SMITHway welded Multi-Layer vessel construction. Here is one of two SMITHway Inconel-lined Multi-Layer Autoclaves for fatty acid service, with a shell thickness of 5 inches and an operating pressure of over 5,000 psi. This vessel was shipped direct by ocean-going ship from Milwaukee to Stockholm.

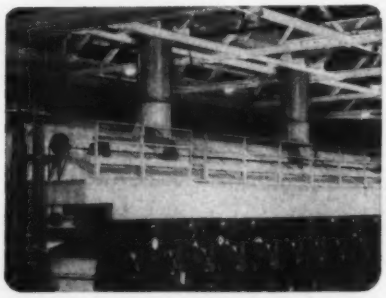


NEW BULLETINS: Write the nearest A. O. Smith office listed above for these new Bulletins: V-44—Field Assembly of Pressure Vessels; V-46—SMITHway Vessels, Alloy, Alloy-Lined Clad, and Glass-Lined.

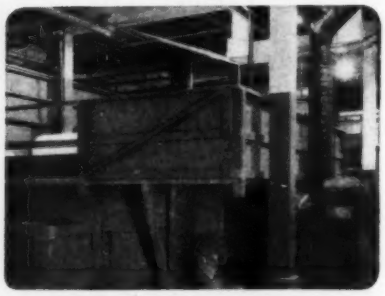
6 common conditions where *WOLMANIZED PRESSURE TREATED LUMBER protects against DECAY and TERMITES

1. Ground moisture and rain held in joints, etc., of outdoor structures.

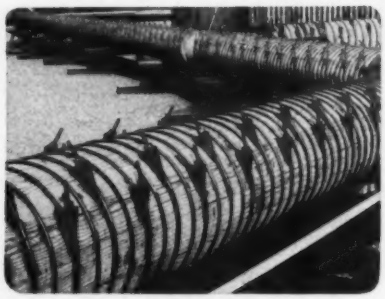
2. Roof decks subject to rapid decay caused by excessive humidity.



3. Where steam and vapor from industrial processes are prevalent.



4. Mixing tanks and equipment exposed to water contact.



5. Where combinations of outdoor exposure and water contact are present.

6. Walls and floors of bins subject to decay caused by moisture condensation.

This Treatment COSTS LESS Than "Replacement-Labor"

Actual service records, available to you, show that "Wolmanized" lumber outlasts ordinary wood by as much as 3 to 5 times.

That's because it is pressure-treated with special chemical salts to give lasting protection against wood-decay and termites.

And the extra cost of using Wolmanized lumber in the first place is actually less than the cost of replacement labor alone, on wood which has failed prematurely.

Here is a true economy which will reduce your maintenance costs and give you sounder buildings. It offers you particular savings under conditions such as those shown above where wood is subjected to moisture and ground exposure—ideal conditions for decay and termites.

Wolmanized lumber is clean, odorless, paintable and non-corrosive to metals.

For complete information and copies of actual performance records, write today to American Lumber & Treating Company.

The latest information on WOLMANIZED pressure-treated LUMBER

Learn more about this money saving pressure treated lumber. Get all the facts and figures on how Wolmanized pressure treated lumber resists decay and termites.

Write today for this new booklet.

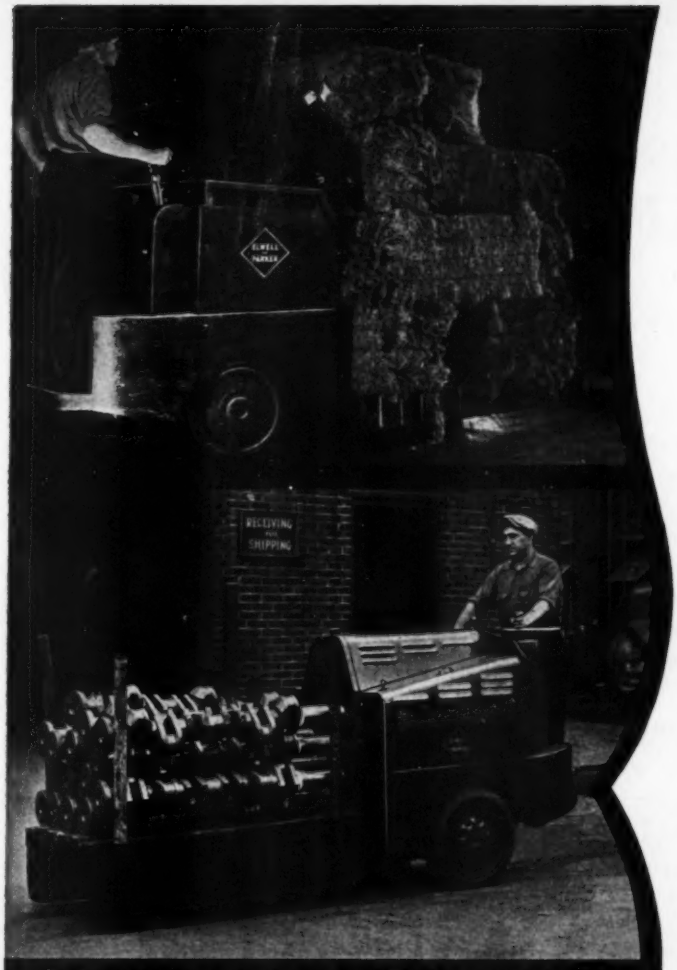
*Registered Trade Mark

WOLMANIZED
Reg. U.S. Pat. Off.

AMERICAN LUMBER & TREATING COMPANY

General Offices: 332 South Michigan Ave., Chicago 4, Illinois

Boston 9, Mass. 141 Milk Street · New York 17, N. Y. 420 Lexington Ave. · Philadelphia 9, Pa. 123 South Broad St. · Washington 5, D.C. 831 Southern Bldg. · Baltimore 3, Md. P. O. Box 1561 · Jacksonville 2, Fla. 719 Graham Bldg. · Los Angeles 15, Calif. 112 West 9th Street · San Francisco 5, Calif. 604 Mission Street · Portland 5, Oregon 1220 S.W. Morrison St.



E-P gasoline power trucks are available for particularly long hauls where fire-hazard is unlikely and fumes unobjectionable.

ELWELL-PARKER LOW LIFT TRUCKS

An Easy, Economical step toward complete mechanization

For deliveries from spot to spot, E-P Low Lift Trucks are a profitable advance from hand trucks. These RIDDEN trucks *offer triple savings because they go 3 times faster.* Of course, they also carry larger loads and have a power lift. Skids from your hand trucking system can still be readily used. Where they will serve adequately, low lift trucks represent the smallest investment beyond manual handling.

Elwell-Parker builds a complete line of RIDDEN low lift trucks. Capacities, 2 to 10 tons; reasonably prompt deliveries. If necessary, platforms of special length and width can be furnished.

Have your man show you the numerous advantages of these low lift trucks. The Elwell-Parker Electric Company, 4241 St. Clair Avenue, Cleveland 14, Ohio.

FREE BOOKLET

describes scientific materials handling—ask for "Industrial Logistics"

VISIT OUR EXHIBIT

NATIONAL MATERIALS HANDLING SHOW

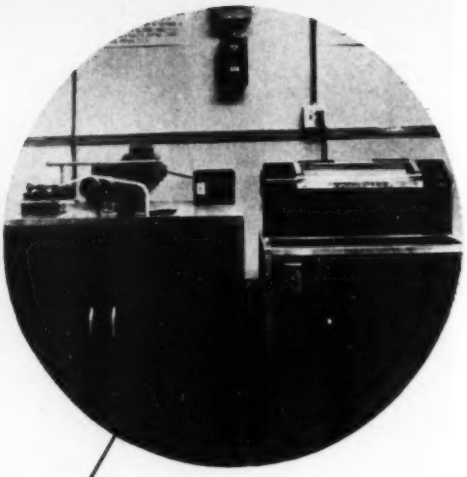
PHILADELPHIA—MAR. 10-14, 1949

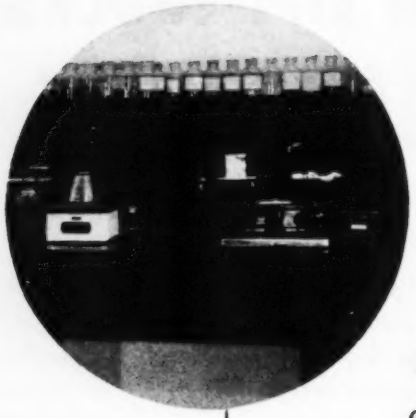
Reduce Your Costs

ELWELL-PARKER

Established 1893

POWER INDUSTRIAL TRUCKS





NEW TRICKS IN AN OLD TRADE

Over the entire span of modern paper manufacture, paper machine felts have been made in the same general way—same general way, that is, until Orr chemically-treated felts appeared. ¶ Development of ORR-CHEM (treated) felts is now gradually revolutionizing the art of felt manufacture—not the actual weaving of the felts, but the further processing of them after weaving to insure better service on the paper machine than would otherwise be possible. ¶ Now, a fully equipped laboratory has been installed in which to study and test felts—for stretch, porosity, fatigue resistance, etc. ¶ Research ever seeking the new to replace or improve the old.

THE ORR FELT & BLANKET CO., PIQUA, OHIO

ORR-CHEM

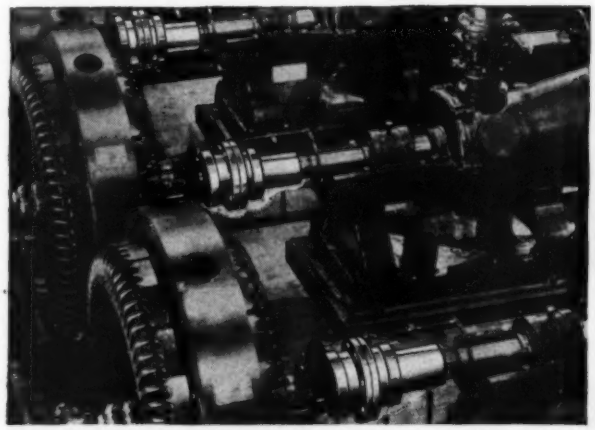
ORR-CHEM *(treated)* FELTS
STANDARD *(untreated)* FELTS
All Machine Requirements

How to Get

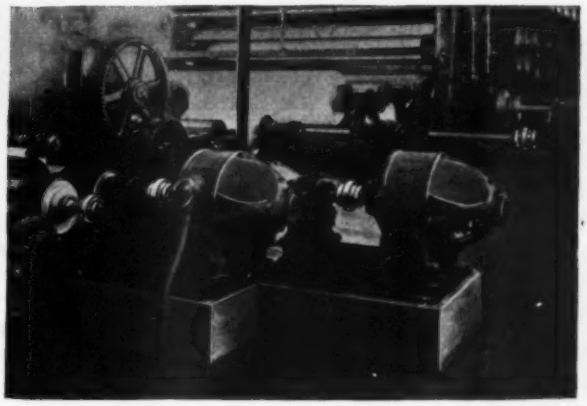
Uninterrupted Power Transmission for All Paper Mill Drives!

SPECIFYING Fast's self-aligning Couplings is the answer! No matter what your coupling problem, there's a Fast's made to solve it . . . and give you longer machine life, lower upkeep costs and minimum shut-down losses. For absolute dependability, these *original* gear-type couplings are built with many important features . . . such as an *exclusive* "rocking bearing."

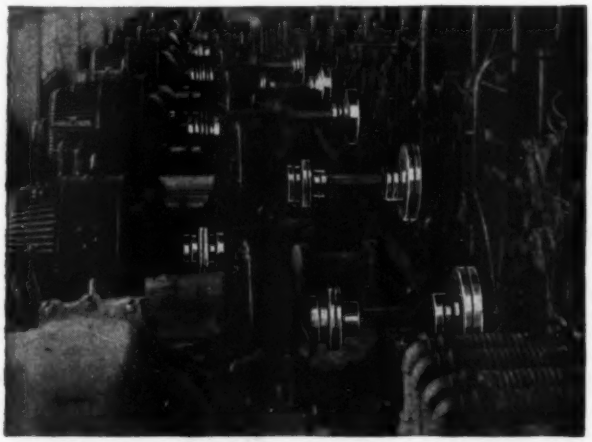
This bearing is *exclusive* in providing a positive metal-to-metal seal against wear-producing moisture, dust and grit. The bearing is also exclusive in its correctly engineered position which allows *freedom of movement* to compensate for misalignment because its *spherical* base has *the same axis* as the hub spline faces. And as a plus, Fast's Couplings give you the benefits of years of top engineering experience, Koppers' high standard of workmanship and unexcelled coupling service which assures spare parts no matter how old your couplings may be. For full information, mail the coupon below to: Koppers Co., Inc., Fast's Coupling Dept., 3323 Scott St., Baltimore 3, Md.



FOR JORDAN ADJUSTMENTS—Fast's Jordan-Type Couplings reduce wear on bearings, prolong life of motor and Jordan. Because the Fast's splines are meshed in oil, plug adjustment is smooth and certain. No worn spots can develop. The customary "hard spot" is eliminated. Due to smooth torque and elimination of coupling vibration, Jordan lining life is increased and the product discharged from the Jordan is uniform.



FOR STANDARD APPLICATIONS—Fast's Standard Couplings are designed for use on all ordinary installations. They are made in shaft sizes from 1½" to 5".



FOR REMOTE DRIVES—Fast's Floating Shaft Couplings enable drives to be set back from paper machines without the use of supporting bearings. This eliminates one piece of equipment—does away with the necessity of keeping three or more bearings in line—saves installation cost and eliminates upkeep, attention and replacement of bearings.

K KOPPERS

FAST'S *self-aligning* COUPLINGS

SEND FOR FREE CATALOG!

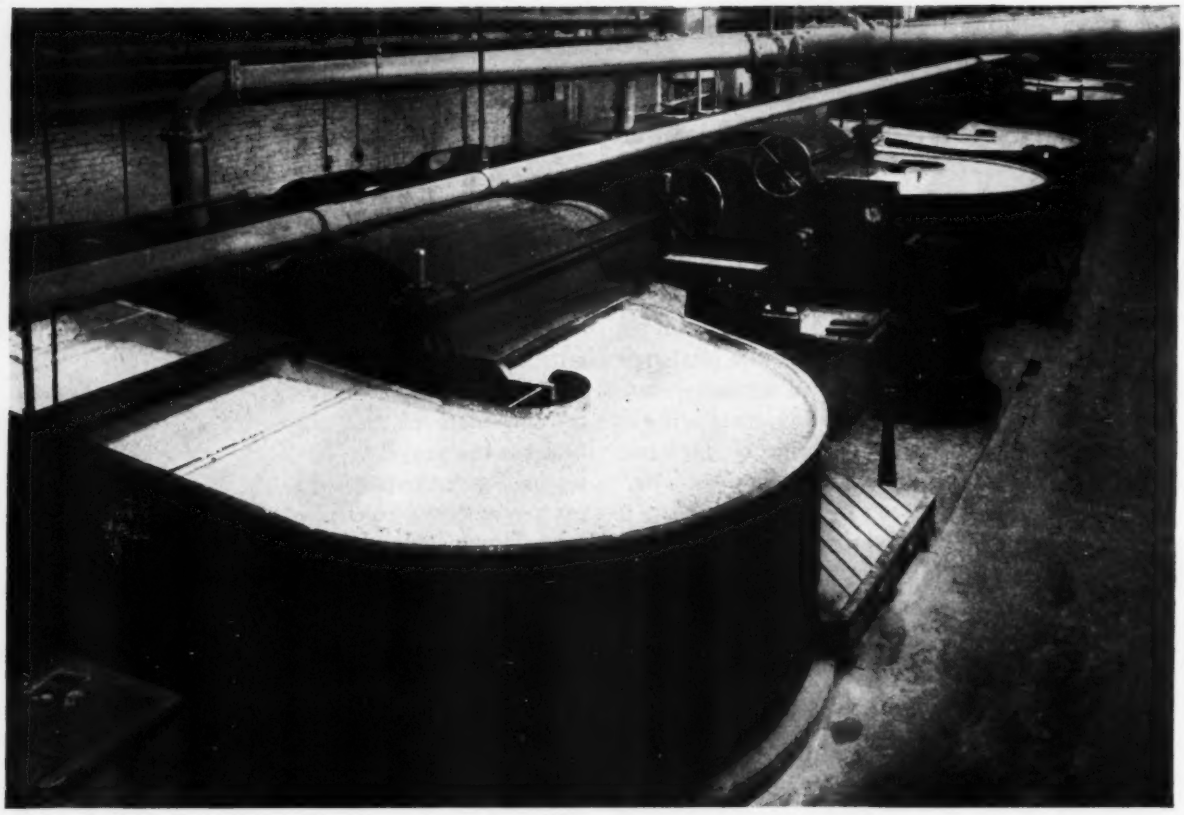
Gentlemen: Please send me your illustrated, informative catalog, giving full information on the many types of Fast's Couplings.

Name.....

Company.....

Street.....

City.....Zone.....State.....



3 to 5 times THE WORK WITH MIDWEST AUTOMATICS

Except for superficial appearance these six Midwest automatics are as different from ordinary beaters as day is from night.

These six beaters are doing from 3 to 5 times the work of which ordinary beaters are capable—processing around 50 tons each. Five of them are ahead of five machines running a wide range of specialty papers, each beater serving its own particular machine. The sixth is a spare.

Each succeeding furnish, for a given grade, is an exact duplicate of all previous furnishes for that grade. Any earlier furnish required for some other grade may be duplicated exactly. That is all controlled automatically, a feature not found on ordinary equipment.

The power saving is truly tremendous. In a conventional beater most of the power is used to circulate the stock. In a Midwest automatic most of the power is used for work on the stock, relatively little for circulation.

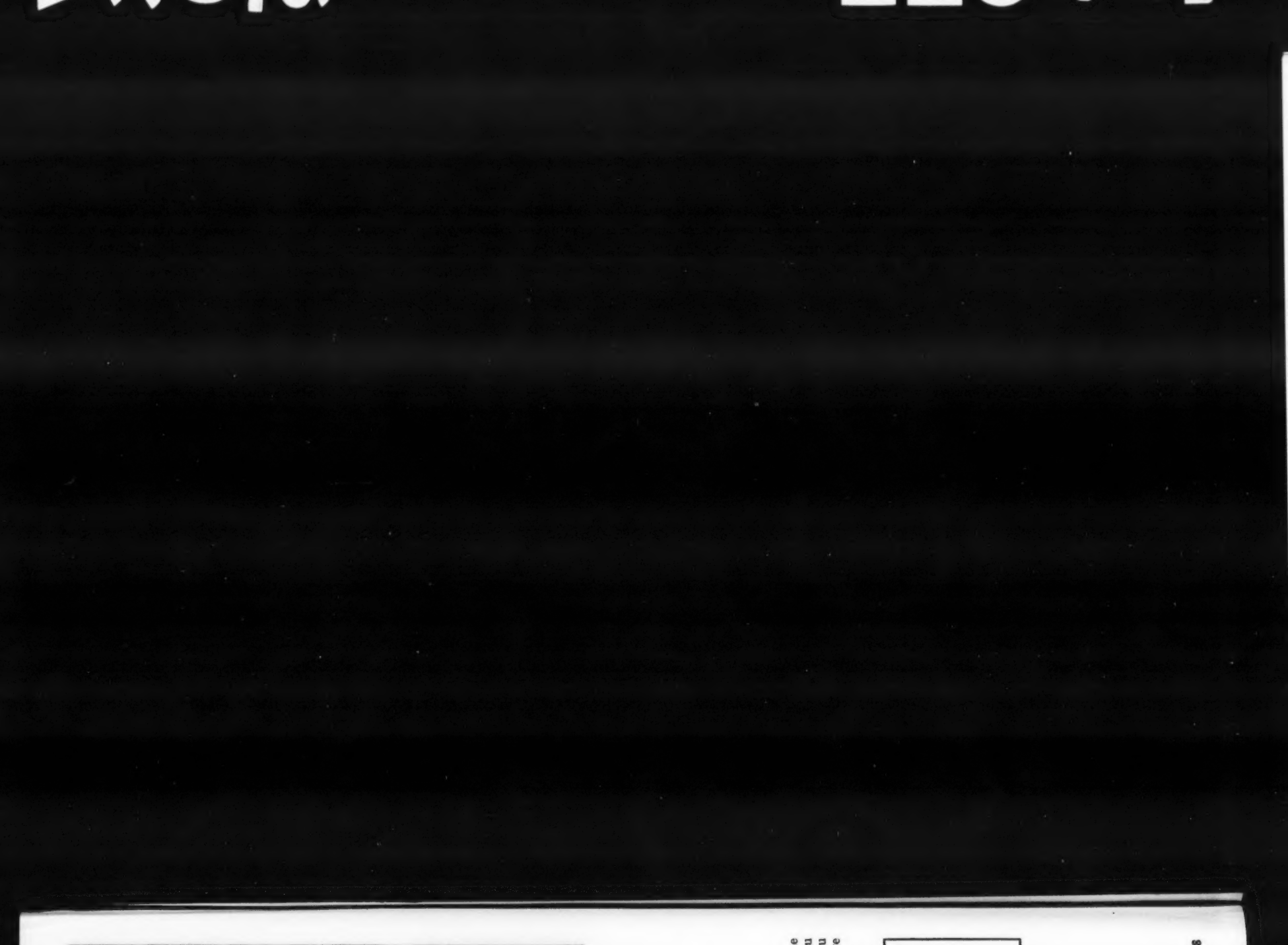
Since one Midwest automatic will do the work of 3 to 5 ordinary beaters, the initial investment per ton of capacity is bound to be lower. As for maintenance, there has been virtually none on the beaters mentioned above and they've been operating several years. The saving in floor space is obvious.

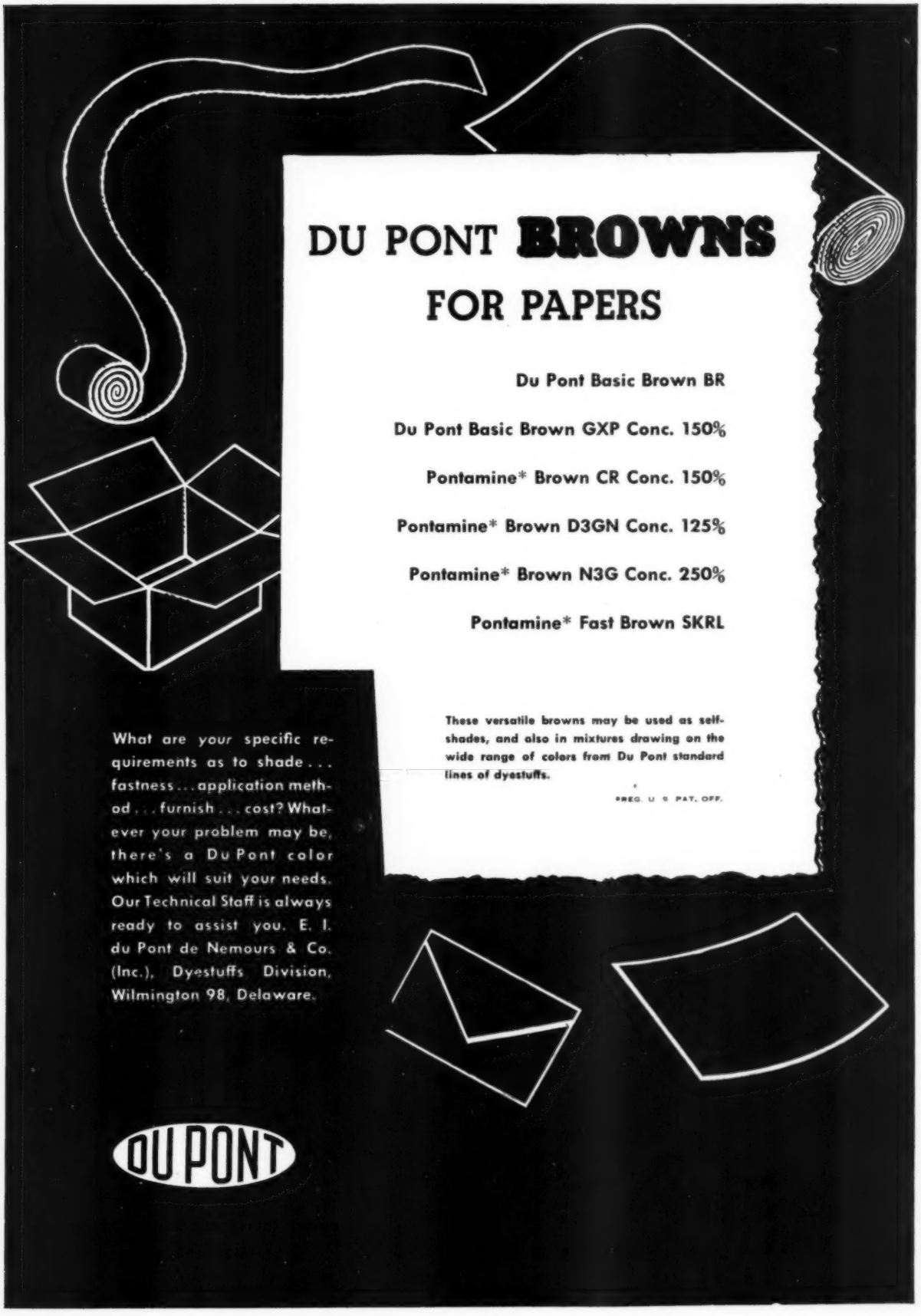
Here is a beater capable of beating all the stock a 112" or 116" machine can use—a beater that would save you money—far more money than you may at the moment realize. Let us give you *all* the facts.

MIDWEST-FULTON
DRYER DRAINAGE SYSTEMS
MIDWEST PULPERS
STANDARD BEATERS
AGITATION EQUIPMENT
AUTO-FLEX DRYER SYPHONS
BALL
SIGHT-FLOW INDICATORS, ETC.

THE MIDWEST-FULTON MACHINE CO., Dayton 1, Ohio

Midwest-Fulton




DU PONT BROWNS
FOR PAPERS
Du Pont Basic Brown BR
Du Pont Basic Brown GXP Conc. 150%
Pontamine* Brown CR Conc. 150%
Pontamine* Brown D3GN Conc. 125%
Pontamine* Brown N3G Conc. 250%
Pontamine* Fast Brown SKRL
These versatile browns may be used as self-shades, and also in mixtures drawing on the wide range of colors from Du Pont standard lines of dyestuffs.
*REG. U. S. PAT. OFF.
What are your specific requirements as to shade . . . fastness . . . application method . . . furnish . . . cost? Whatever your problem may be, there's a Du Pont color which will suit your needs. Our Technical Staff is always ready to assist you. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington 98, Delaware.
DU PONT

"Just what they need!"

What this mill needs is not more drier rolls or more steam to heat them. It needs Hamilton Felts at the wet end of the machines. The eyes of the super will sparkle when he sees how much more water they remove at the presses—how much faster he can run them—how much more tonnage per day—how few ends—how little broke!

And his costs will come down faster than I can slide down the smoke stack.

Merry Christmas and Happy New Year

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Miami Woolen Mills

Hamilton Felts

Established 1858

OLIVER Lime Mud FILTER

8 Reasons why it has earned the No. 1 SPOT in Sulphate Mills . . .

1. . . . end drainage to double cast-iron head and external flat faced valve.
2. . . . ample cross section of drainage passages which greatly reduces frictional resistance to flow of liquid and air.
3. . . . design is such as to justify use of extra large vacuum pumps with relatively small filter area, thus providing greatest capacity and lowest cake moisture. Pumps with 8 to 10 cfm per sq. ft. are recommended.
4. . . . stainless steel division strips insure long life.
5. . . . removable and renewable cast iron grid screens held in place by stainless steel socket head screws.
6. . . . agitator assembly, driven independently of the drum, can be rotated out of vat for inspection or repair.
7. . . . all parts accessible for scale removal.
8. . . . maintenance minimized because of (1) heavy cast iron cylinder, (2) stainless steel parts, and (3) small area of filter cloth to be cleaned and renewed.

Well in the lead before the war, the Oliver Lime Filter has been the choice of 16 different mills since the war, a total of 19 units being installed or on order since 1945.

When you are in need of a lime mud filter *—and order an Oliver—*you are getting the lime mud filter with *proved* durability and efficiency.

OLIVER UNITED FILTERS INC.

UF INC.

New York 18, N. Y.
33 West 42nd Street

San Francisco 11, California

Chicago 1, Ill.
221 N. LaSalle Street

Western Sales Division
Oakland 1, California
2900 Glascock Street

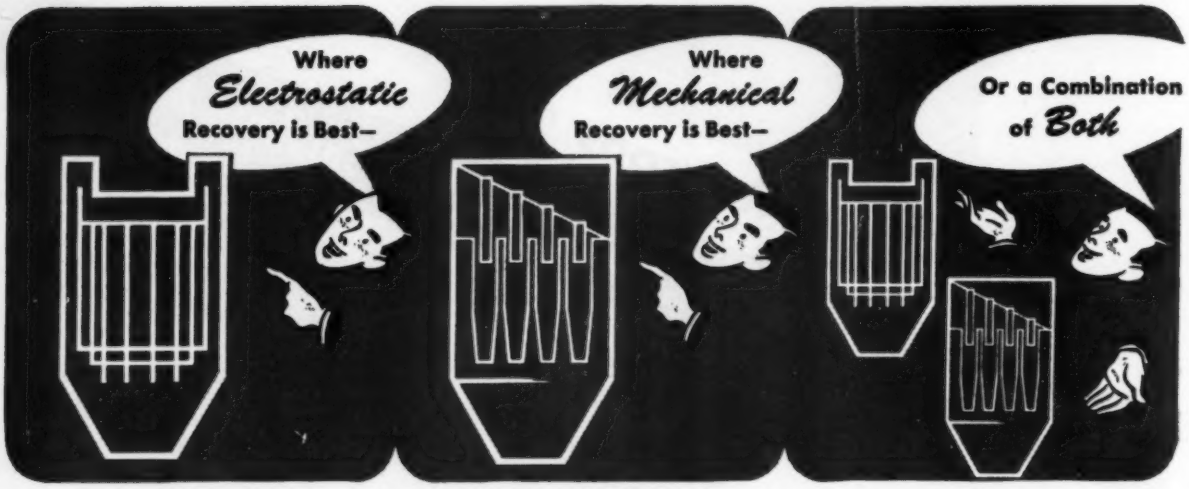
Sales and Manufacturing Representative:
E. Long Limited
Orillia, Canada

Factories: Oakland, Calif. • Hazleton, Pa. • Orillia, Canada • Melbourne, Australia

This is the UNIQUE ADVANTAGE

Western Precipitation provides for simplifying YOUR Dust Recovery Problems . . .

If you are not sure whether yours is a job for Cottrell or mechanical separation methods, you'll get an unbiased recommendation from Western Precipitation Corporation because this organization designs, engineers and installs BOTH!



THE COTTRELL ELECTRICAL PRECIPITATOR

Western Precipitation is the organization that pioneered the first commercial application of the now-famous Cottrell Electrical Precipitator. And its unique advancements and refinements in the basic methods, developed through more than 38 years of first-hand experience in Cottrell installations, assure you of the most modern in electrostatic recovery equipment from Western Precipitation Corporation. Cottrells handle dust, fume, fly ash, mists and other suspensions with high efficiency.

THE *MULTICLONE* MECHANICAL COLLECTOR

Companion to the Cottrell is Western Precipitation's widely used *Multiclone* equipment which offers far-reaching advantages in the mechanical separation of solids from gases. Its unique vane design makes possible multiple *small-diameter* separating tubes that combine high recovery efficiency with maximum compactness, minimum maintenance and wide-range adaptability to varying installation requirements. For mechanical recovery of solids, *Multiclone* is unsurpassed in operating efficiency, economy and installation simplicity.

COTTRELL AND MULTICLONE

And here's a priceless advantage provided by Western Precipitation Corporation . . . Frequently there are recovery problems where maximum efficiency and economy in first cost are obtained by using *Cottrell* and *Multiclone* equipment working together. There are many such recovery jobs—fly ash is one, perhaps yours is another—and you can get such a combination installation from one organization, under one responsibility, with one overall guarantee by bringing your recovery problem to Western Precipitation Corporation.

Send for these MULTICLONE and COTTRELL booklets!

REGARDLESS OF YOUR RECOVERY PROBLEM OR YOUR LOCATION

you can benefit by Western Precipitation's leadership and long experience in the science of recovering suspensions of all kinds—both liquid and dry—from gases, hot and cold. Western Precipitation Corporation installed the first successful Cottrell which is still in operation after 35 years of service. No matter what your industry, Western Precipitation is prepared to serve you in *all* parts of the world. Write, wire or call our nearest office.

WESTERN
Precipitation
CORPORATION

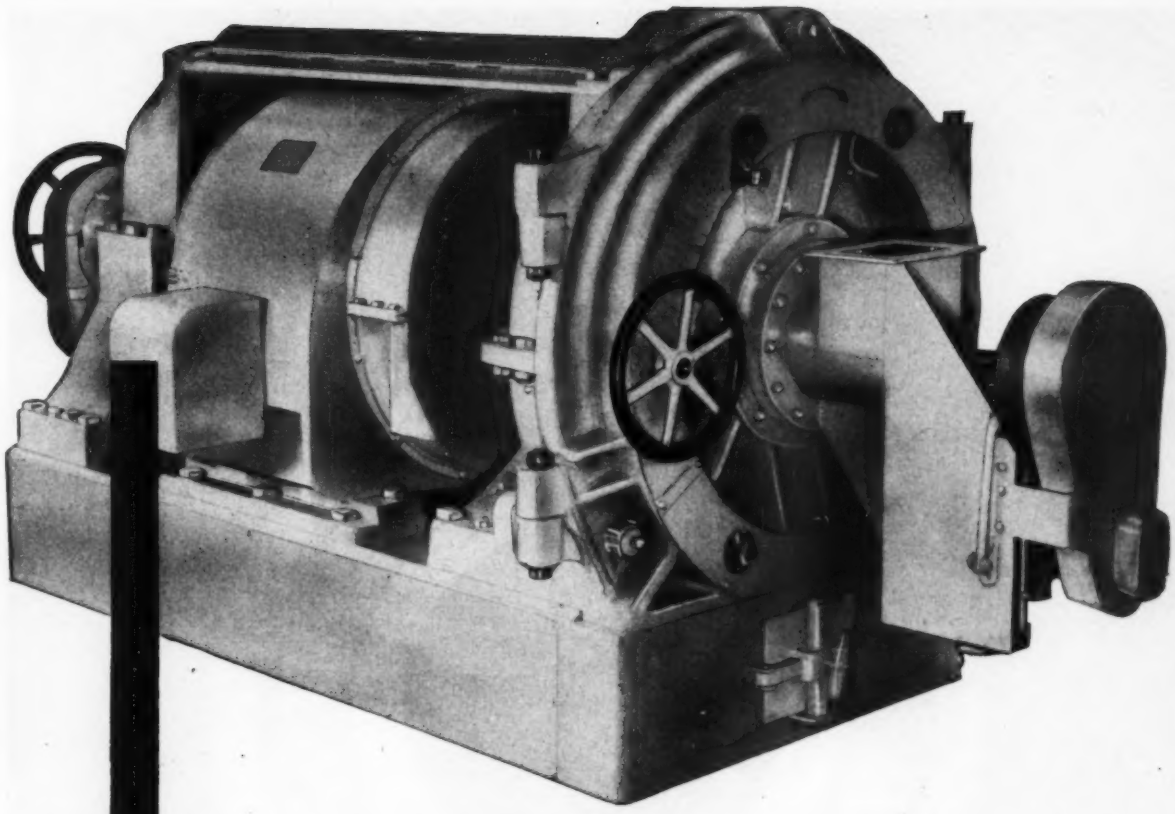
ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1037 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
CHRYSLER BLDG., NEW YORK 17 • 1 LaSALLE ST. BLDG., 1 N. La SALLE ST., CHICAGO 2 • HOBART BUILDING, SAN FRANCISCO 4, CALIFORNIA
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

NOW SELLING...

COTTRELL Precipitators
MULTICLONE Collectors
TURBULAIRE Spray Dryers

...in all parts of the U.S.A. and foreign countries.



A PULP REFINER . . . by Sprout-Waldron — is your assurance of higher tonnage per unit, together with lower power consumption.

Rugged and precision-built, a Sprout-Waldron Refiner weighs over 15,000 lb. Yet, required installation space is only 10′3¼″x 4′9½″ x 5′ 2¾″.

Micrometer adjustments and variously designed fillings give positive and accurate operational control at all times.

Wherever wood pulp refining is a vital operation—from defiberizing semi-chemical to hydrating fully cooked pulps — consider Sprout-Waldron Refiners.

Other Sprout-Waldron machines in the Pulp and Paper Mill Industry are:

(1) Double Agitated Mixers — designed especially for efficient and economical pulp blending.

(2) Rotary Knife Cutters — engineered for the reduction of asphalted papers, cooked flax, bark, etc.

(3) Attrition Mills — outstanding for defiberizing rags and intimate blending.

SPROUT WALDRON
Manufacturing Engineers
MUNCY PENNSYLVANIA

64

Here's a Proved way to set High-Standards in Design

When you've been around for 30 years you're bound to earn some sort of reputation. That's happened to Norma-Hoffmann bearings, and, in thousands of blueprints it gets put down in "blue and white" like this: *Norma-Hoffmann or equal.*

Designers tell us there are extra values in these bearings. That they can specify Norma-Hoffmann and right there a worry is off their minds.

We have certainly set up high enough standards to assure delivering these extra qualities. There's no secret how. It's explained in one word: *precision.*

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HIGH WHITENESS

Fine coated paper, too, reflects light to give an appearance of almost perfect whiteness. When the paper-coating pigment is Wyandotte Precipitated Calcium Carbonate, this quality of "high whiteness" is assured.

Wyandotte Precipitated Calcium Carbonate offers many such advantages to the coated-paper manufacturer. It is high in opacity and covering power . . . free of grit and all other abrasive materials. It is readily and easily dispersible in water and has that uniformity which is so essential to machine coating. It is not excessive in adhesive demand.

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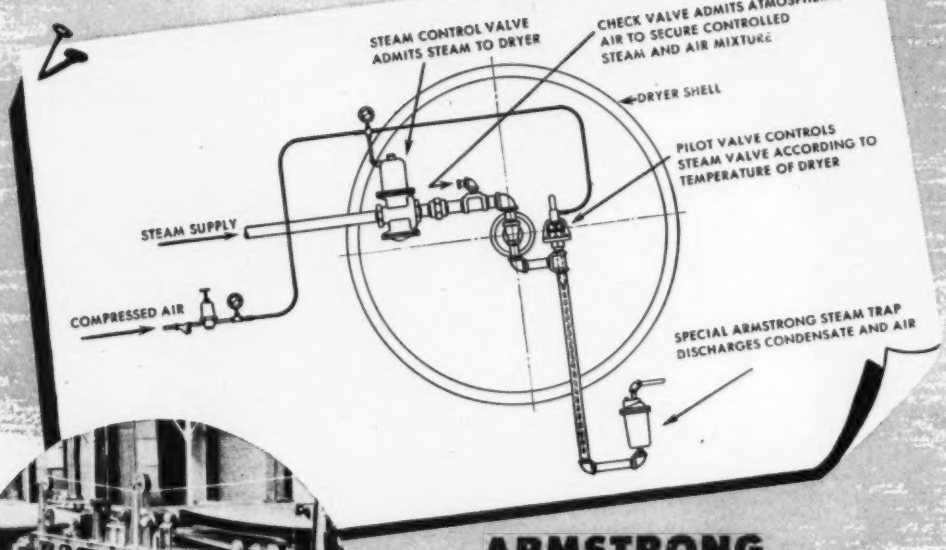
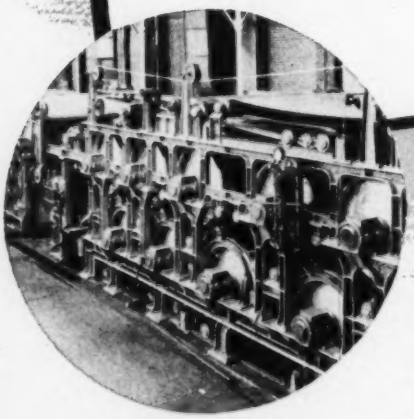
A NEW ANSWER
to an old drying problem


STEAM CONTROL VALVE ADMITS STEAM TO DRYER
CHECK VALVE ADMITS ATMOSPHERIC AIR TO SECURE CONTROLLED STEAM AND AIR MIXTURE
DRYER SHELL
PILOT VALVE CONTROLS STEAM VALVE ACCORDING TO TEMPERATURE OF DRYER
STEAM SUPPLY
COMPRESSED AIR
SPECIAL ARMSTRONG STEAM TRAP DISCHARGES CONDENSATE AND AIR



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Individual Dryer
TEMPERATURE CONTROL

Eliminates Picking and Curling

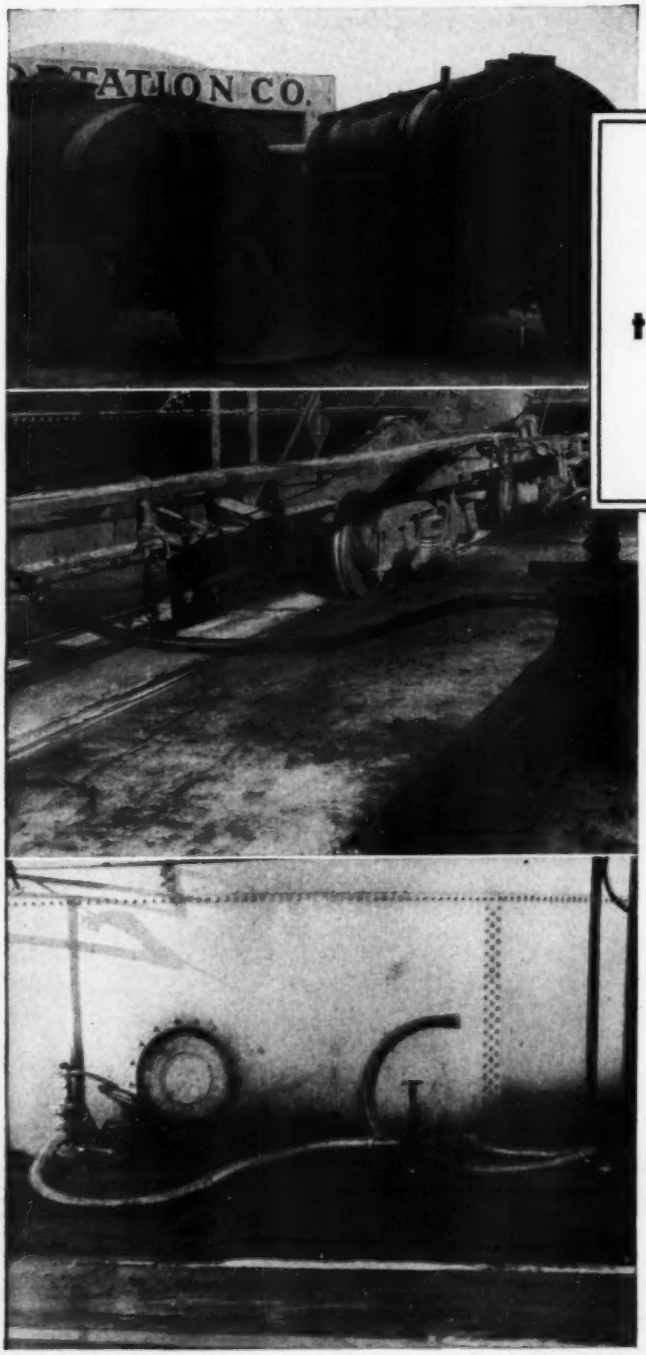
ARMSTRONG Individual Dryer Temperature Controls are used to accurately maintain reduced temperatures in the first four or five dryers at the wet end of a paper machine. This keeps the paper from sticking to the surface of the dryer and prevents curling due to over-drying one side of the sheet. Each dryer is controlled independently of any other dryer and can be regulated at any point from 100° to 250° F. Temperatures below 212° F are secured by controlling a mixture of steam and air in the dryer. Above 212° F, no air is mixed with the steam and control is entirely by steam pressure.

- CONTROLLED MIXTURE OF STEAM AND AIR MAINTAINS REDUCED TEMPERATURES
- EACH DRYER CONTROLLED INDEPENDENTLY
- ACCURATE AND UNIFORM
- 100° F TO 250° F RANGE
- DEPENDABLE
- COMPLETELY AUTOMATIC
- PROVEN AND GUARANTEED

The Armstrong Control is simple, dependable, and guaranteed to give satisfaction. For complete information write for BULLETIN 187 which fully describes the principle of operation and the component parts of the control.

ARMSTRONG MACHINE WORKS
816 Hoffman Street, Three Rivers, Mich.

INVERTED BUCKET STEAM TRAPS • PAPER MILL SPECIALTIES



CMH REX-TUBE Type RT-15

the economical, dependable fully interlocked flexible metal hose

CMH REX-TUBE, Type RT-15, flexible metal hose offers users seven important advantages which add up to dependability with economy—

(1) HIGHLY FLEXIBLE—Fully interlocked construction.
(2) DURABLE—Manufactured of bronze or steel.
(3) VERSATILE—Suitable for conveying steam, tar, asphalt, vegetable oils, hydrocarbons, as examples.
(4) NON-AGING—Durable metal construction.
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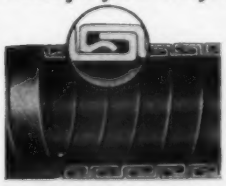
(7) NO JOINTS TO PACK—The hose takes the motion, not the couplings.

Write today for complete information on how Rex-Tube RT-15, can serve you economically and dependably. Data sheets and specifications furnished on request.

Rex-Tube is part of CMH's complete line of flexible metal hose and related products. Write for further information.



REX-TUBE TYPE RT-15—Fully interlocked flexible metal hose. Sizes ½" thru 12", I.D. Suitable for temperatures to 600°F and pressures to 500 psi.

"FLEXON" identifies CMH products, which have served industry for more than 45 years.

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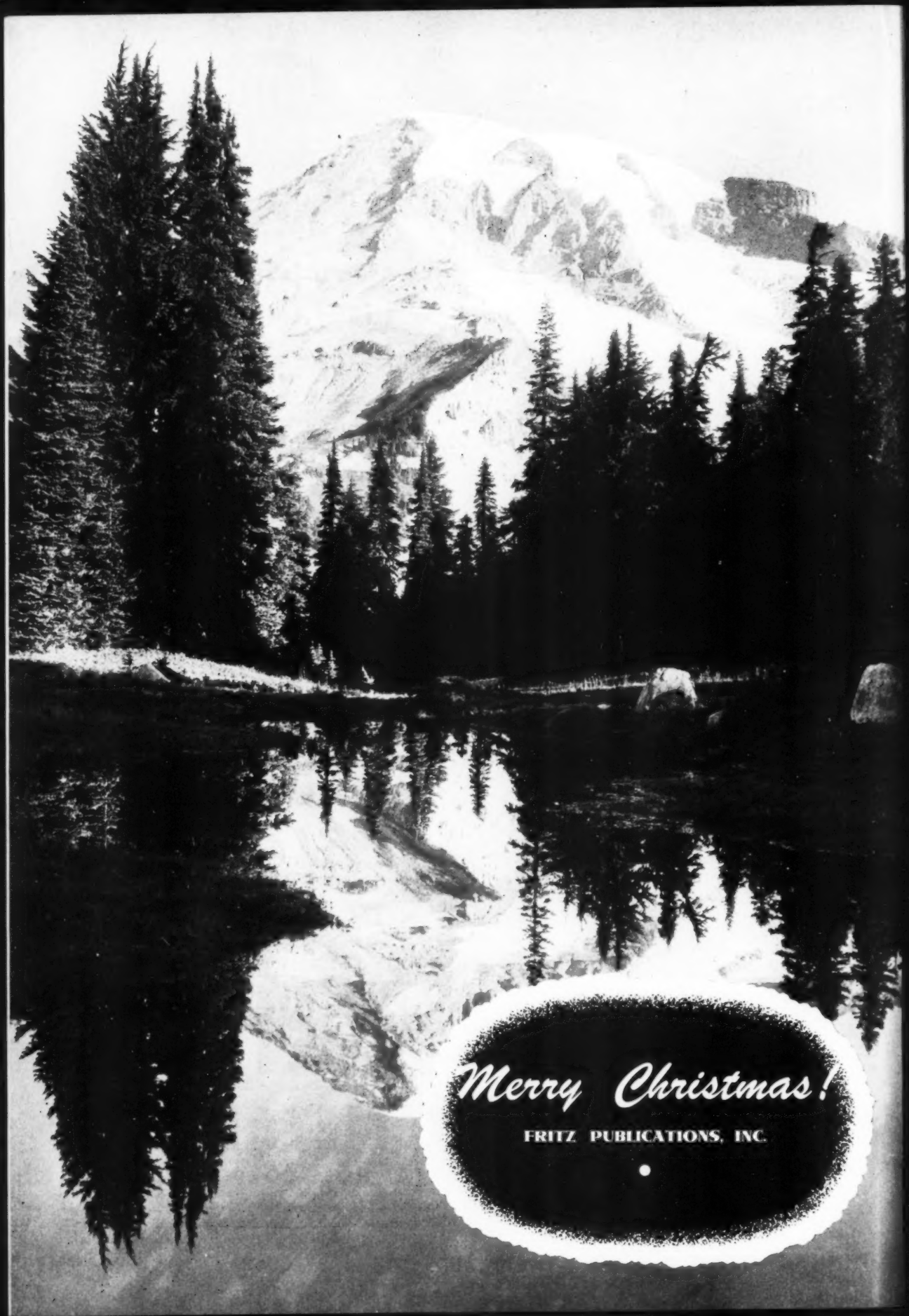
CHICAGO METAL HOSE CORPORATION

Maywood, Illinois

Plants at Maywood, Elgin and Rock Falls, Illinois

In Canada: Canadian Metal Hose Company, Limited, Brampton, Ontario


Merry Christmas!
FRITZ PUBLICATIONS, INC.

Mill to Make Dissolving Pulp from Hardwood Planned by I. P. Company

▶▶▶ THE FIRST RAYON PULP mill in the world designed to employ an entirely new process for producing dissolving wood pulp used in the manufacture of rayon and other synthetic products will be built in the South by International Paper Company. This announcement was released on November 5, 1948, by John H. Hinman, company president.

Significance of the development, according to Mr. Hinman, lies in the fact that for the first time in the history of the manufacture of rayon pulps, hardwoods instead of softwoods can be used, and the new process is based on the sulphate process instead of the sulphite process used traditionally for making such pulps.

The exact location of the new mill has not yet been determined, but all plans and engineering have now been completed and construction is scheduled to be finished early in 1950. The mill will have a capacity of 300 tons a day, or a yearly capacity of about 100,000 tons, and will increase by approximately 16 per cent the present estimated North American output of rayon pulp. The construction and operation will be under the direction of the Southern Kraft Division of the company, which now operates eight mills in the South.

According to Mr. Hinman, the new project involves radical changes in the sulphate process, also entirely novel methods of purification and bleaching, resulting in a dissolving pulp which not only produces yarns and other end products of superior strength but which can be processed more rapidly by the convertors, resulting in lower operating cost and considerable saving in their capital investment.

Pulp produced by this new process, Mr. Hinman further explained, is of the highest grades used for the production of rayon yarns, cellophane, plastics and allied products.

Development of the process is the result of many years intensive research work and plant studies, and pulp already has been manufactured by this process in substantial tonnages and has been proved out by the makers of rayon yarns and other end products in their own manufacturing operations. The new process, Mr. Hinman states, combines the technical experience of International Paper Company and its Canadian subsidiaries. It was developed by the company's Southern Kraft Division with the technical advice of Dr. Sigmund Wang, president, and the staff of Industrial Cellulose Research Limited, wholly-owned research affiliate of Canadian International Paper Company, which operates at Hawkesbury, Ontario, one of the world's foremost research and control centers for developing new techniques in the manufacture of dissolving wood pulps and in the conversion of pulp into end products by standard commercial processes.

While the new mill will be under the direction of the Southern Kraft Division of the Company, the operating staff will have the assistance and advice of Dr. Sigmund Wang and the other members of the staff of Industrial Cellulose Research Limited on all technical phases of operations. Funds for the mill will be provided without borrowing or the sale of securities.

FINANCIAL

▶▶▶ PAPER-MILL securities in general followed the rest of the securities markets in the sharp slump which followed the unexpected result of the presidential election.

American Writing Paper Corporation—Net loss for the nine months ended September 20 was $101,383 as compared with a gain for the similar period in 1947 of $465,873.

Continental-Diamond Fibre Company—Net profit for nine months ended September 30 was $590,746, as compared with $898,165 for the same period in 1947.

Crystal Tissue Company—Net profit for the first nine months of 1948 was $181,457 as compared with $186,878 for the same period in 1947.

Dixie Cup Company—Net income for the fiscal year ended September 30 was $1,716,279 as against $1,416,959 for the preceding fiscal year.

Eastern Corporation—Net income for nine months ended September 30 was $1,632,149 as against $1,123,114 for the same period in 1947.

Great Northern Paper Company—Net income for nine months ended September 30 was $3,399,104 as compared with $3,407,559 for the same period a year ago.

Hinde & Dauch Paper Company—

Net income for nine months ended September 30 was $3,194,743 as compared with $3,239,026 a year ago.

Hollingsworth & Whitney Company—Net earnings for thirty-nine weeks ended September 26 were $2,722,866 as compared with $1,952,970 for the comparable period in 1947.

International Paper Company—Net profit for nine months ended September 30 was $45,358,851 as compared with $43,124,402 for the comparable period in 1947.

Kimberly-Clark Corporation—Net income for nine months ended September 30 was $2,550,103 as against $1,876,874 for the same period in 1947.

Masonite Corporation—Net income for the year ending August 31 was $7,027,335 as compared with $4,381,142 for the previous year.

Mead Corporation—Net income for forty weeks ended October 2 was $3,663,819 as compared with $3,821,439 for the comparable period a year ago.

Nekoosa-Edwards Paper Company—Net income after setting aside $450,000 for plant improvements was $1,709,395 for the first nine months of 1948 as compared with $2,123,775 a year ago. Net sales in the current period were one and three-quarter million dollars above the 1947 similar period.

Paraffine Companies, Inc.—Net income for nine months ended September 30 was $957,186 as against $808,518 for the same period in 1947.

Rayonier, Inc.—Net income for nine months ended September 30 was $3,732,969 as against $4,340,643 for the same period in 1947.

Scott Paper Company—Net income for nine months ended September 30 was $2,550,103 as against $1,876,874 for the same period in 1947.

Soundview Pulp Company—Net income for nine months ended September 30 was $4,367,148 as compared with $4,640,237 a year ago.

St. Regis Paper Company—Net income for nine months ended September 30 was $12,048,192 as compared with $11,055,144 for the 1947 period.

Union Bag & Paper Corporation—Net income for nine months ended September 30 was $10,546,336 as compared with $8,787,425 a year ago.

United Wallpaper, Inc.—Net income for nine months ended September 30 was $1,632,149 as against $1,123,114 for the same period in 1947.

Paper Mill Corporate Changes

St. Regis Paper Company—An issue of $10,000,000 in fifteen-year 3⅝ per cent debentures has been sold at par to a group of insurance companies. The proceeds will be used to retire funded debt of subsidiaries and to increase working capital.

St. Croix Paper Company—Stockholders have ratified the sale of a large block of stock to New York Daily News interests, details of the proposed sale having been reported previously.

Hammermill Paper Company—Stockholders have approved the splitting of the company's common stock. Two shares of the new common will be issued for each share previously held.

Fibreboard Products, Inc.—Stockholders have been asked to authorize a $25,000,000 loan from an insurance company for the retirement of $15,000,000 in bank loans and to finance plant expansion.

Masonite Corporation—The Securities and Exchange Commission has been notified that Masonite Corporation will issue 81,250 new shares of common stock, leaving only 18,750 authorized shares unissued. The company plans to acquire at least 80 per cent of the outstanding stock of Marsh Wall Products Company of Dover, Ohio, engaged in the processing of hardboards. This purchase marks the entrance of Masonite into the marketing of decorated wall boards.

New York Stock Exchange—Stocks

	Closing Prices Nov. 26	Oct. 25
A.P.W. Products	*4½-4⅞	*4⅝-5
Celotex	24½	28
Same Preferred	*18½-18¾	*19-19¼
Certain-teed Products	12¼	16⅝
Champion P & F. Co.	23	25½
Same Preferred	94¼	96-98
Chesapeake Corp.	28⅛-28½	29
Container Corp.	35½	39½
Same Preferred	*91⅝-92½	90-91
Continental Diamond	8⅛	10¼
Crown Zellerbach	25	29½
Same Preferred	95⅝	96½
Same $4 Preferred	*95-97	*100-103
Dixie Vortex	28	13
Same "A"	48	47½
Robert Gair	7⅛	7¼
Same Preferred	17⅜	17⅝
Gaylord Container	17⅜	19⅛
International Paper	52¼	58⅝
Same Preferred	92¼	*98½-98⅝
Kimberly Clark	21½	19⅞
Same Preferred	95½	*92-94
McAndrews & Forbes	*36⅝-37½	*36¾-37⅛
Marathon	20⅜	24⅝
Masonite	57½	61¾
Mead Corp.	16½	19⅛
Same Preferred	82½	*85½-87½
Same 2nd Preferred	32⅞	*37-38⅜
National Container	9⅜	11⅞
Paraffine Cos.	20¼	23⅜
Same Preferred	*102-104	*100½-102
Rayonier Inc.	27⅛	33½
Same Preferred	*32⅜-32¾	33
Scott Paper	47¼	50¼
Same Preferred	*88½-90	88½
St. Regis	8¾	11
Same Preferred	83½	*87-87½
Sutherland Paper	*36-38	42½
Union Bag & Paper	29⅝	32⅜
United Board & Carton	8	*16¼-16½
United Wall Paper	3½	4¼
Same Preferred	*24½-28	*26⅝-28½
U.S. Gypsum	101	106¼
Same Preferred	*171-174	169
West Va. P & P Co.	42	43¾
Same Preferred	*105-106	*113¾-105½

New York Stock Exchange—Bonds

Celotex 3½%	.....	.....
Champ. P&F Co. 3%	.....	.....
Certain-Tees 3%	.....	.....

New York Curb Exchange—Stocks

Am. Writing	5	.....
Great Northern	36¼	39
Taggart	8	11½

*Closing Bid and Asked Prices.

RISING PAPER CO. INFORMS EMPLOYEES OF RETIREMENT FUND AT COMPANY DINNER

Resuming an annual affair, 200 employees of Rising Paper Company, Housatonic, Massachusetts, enjoyed a dinner and social program at the Berkshire Inn a few months ago. At the dinner, the workers were informed of a retirement policy the company has made possible for them.

Walter E. Daverin, company vice president and treasurer, presented the retirement plan, explaining the provisions. Fred E. May, president, acting as toastmaster, addressed the gathering on the problems of the firm, describing its position in the fine paper industry. He also spoke of future prospects, paying tribute to the employees for their loyalty, skill, and co-operative effort.

▼

RHINELANDER CONTEST IS CLOSED—"RIPCO MAID" CHOSEN FOR NEW MACHINE

Including entries from all over the world, the Rhinelander Paper Company, Rhinelander, Wisconsin, received over 7,000 name suggestions for their recently completed glassine paper machine. The name chosen to christen the new machine, "Ripco Maid," was submitted by an employee, Otto Stark of the Stores Department, winning first prize in the employee's contest group. The winner of first prize in the general contest was "Mister Ripco" suggested by H. D. Graham, of the Graham and Jones Paper Company, Jacksonville, Florida.

The contest idea was developed as the Rhinelander Paper Company neared the completion of a $4,000,000 expansion program, installing their seventh big machine. Since the last machine set up by the company had become famous under the catchy name of "The Big Swede" it seemed appropriate to stage a contest naming the new machine (Cf. P.I. and P.W. Sept., 1948).

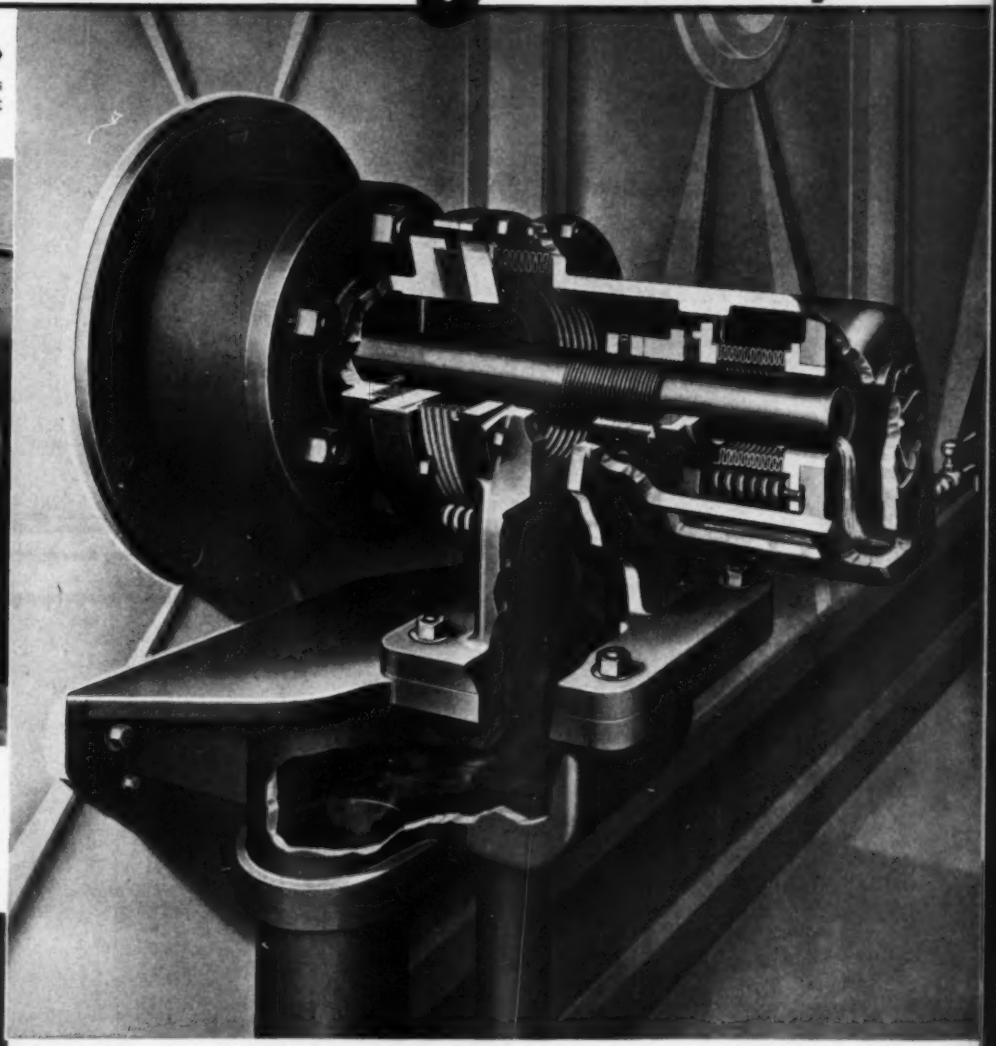
The majority of names received had a Scandinavian flavor. Other classifications of entries revolved around bigness, Rhinelander, the idea of twinship, brotherhood or sistership, America and Yankee, Wisconsin and Badger, giants and strong men, the numeral seven, etc. In judging the names, the management felt it did not want a Scandinavian title. Naming one machine the Big Swede was a one-time inspiration but there was no desire to continue the Viking accent. Other names, no matter how good, were ruled out if they had no special application to Rhinelander. This left only three categories from which to pick the win-

PAPER · · · America's 6th Industry

Cutaway view of Puseyjones Improved Steam Joint

seyjones Improved Steam Joint in-lled on Dry Part having enclosed pe gearings. Can also be used on y Part with open type gearing by aching bracket to special outside pe structure.

pporting bracket for Puseyjones Im-oved Steam Joint with vertical steam d water piping attached. See water ssage within the bracket.



Now More than 2,000 Successful Installations

"So low in power consumption . . . so economical in maintenance . . . so easy to replace worn parts without shutdown . . . so trouble-free in operation . . ." These are just a few of the mill reports on the Puseyjones Improved Steam Joint. There are more than 2,000 now in use.

In the "Steam Joint Bulletin," we give full details on this remarkable new development, describing its application in connection with modern siphon type evacuators. Write for your copy today.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

Wilmington 99, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

ner—names involving Rhinelander, Ripco, or the numeral seven.

Two contests had been run simultaneously, with two sets of prizes, one for Rhinelander employees and one among the public. Second and third prize general winners were the Rhinelander Clipper and Miss Seven. Fifty additional contestants received consolation prizes of select, well aged Wisconsin cheese.

▼

NEW CROSSETT RESEARCH LABORATORY WILL BE USED BY 3 COMPANY INDUSTRIES

Since its founding almost fifty years ago, the Crossett Lumber Company, Crossett, Arkansas, has been a pioneer in planned forestry. A new laboratory, just completed, has been planned with the hope that the new installation will enable the Crossett industries—the Crossett Paper Mills and the Crossett Chemical Company—to improve the quality of their products. It is believed that the new research laboratory will be another step toward the company's goal, the more complete utilization of every tree that is harvested.

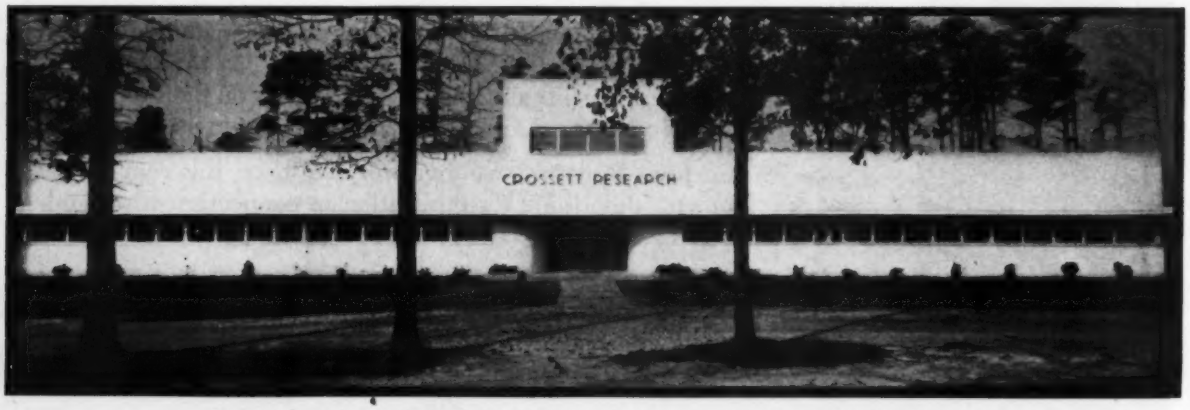
The new laboratory is a T-shaped structure, built by the Austin Company. Each wing performs a separate and distinct function. One wing houses tthe offices and library, one the laboratory, and the other the pilot plant. The interior wood stud walls may be moved and rearranged, thus permitting a wide latitude of possibilities in allocating space to various departments.

The staff of the research laboratory will conduct research in pulping as well as papermaking. Miniature equipment in a special department of the building will enable the researchers to carry out, on a small scale, the same processes that are conducted industrially in the mill.

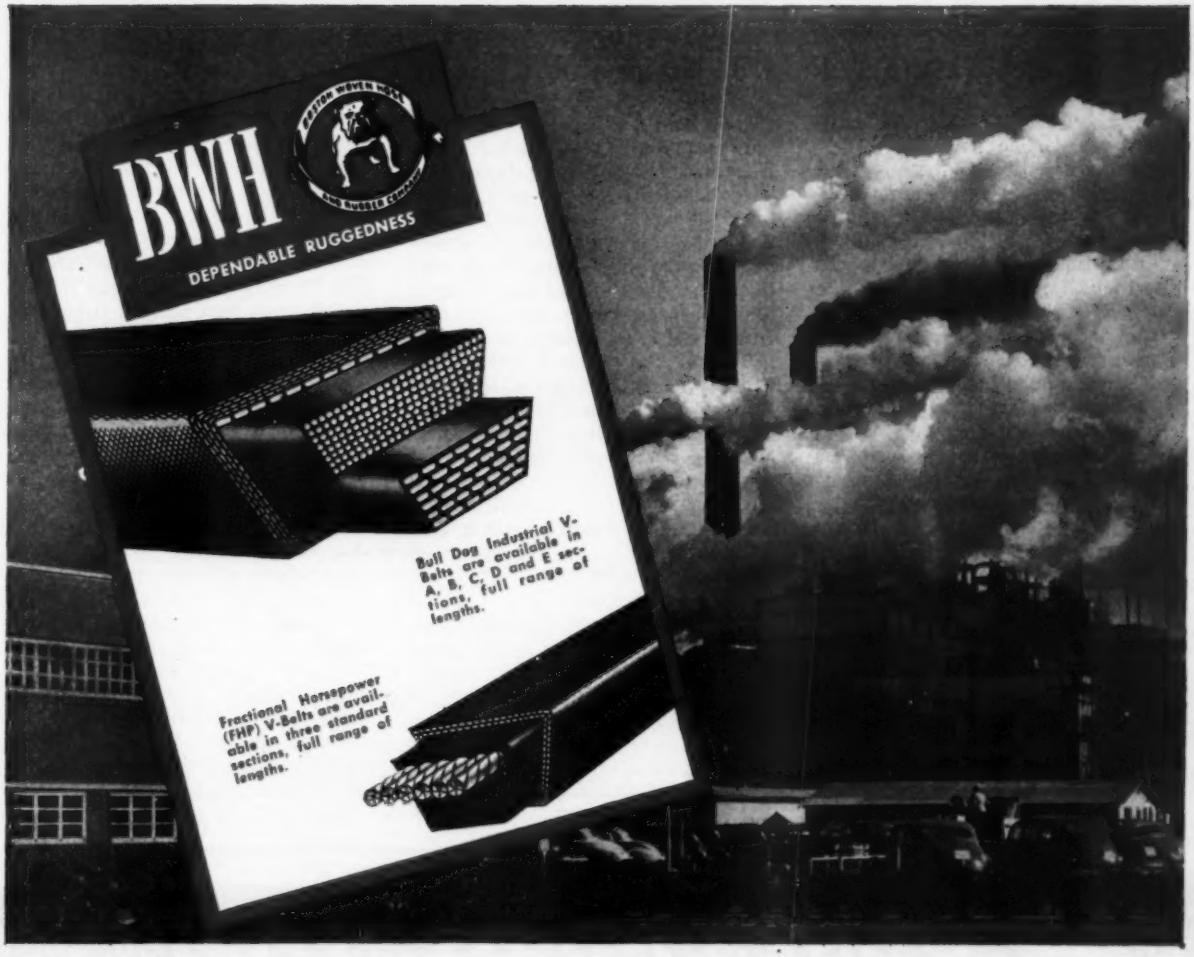
The Crossett Chemical Company, which will also be served by the laboratory, is a wood distillation industry.

Interior view of the laboratory showing Kem-Rock table and sink tops

Library and conference room of the Crossett Laboratory; this room has a built-in motion picture screen



Crossett's recently completed research laboratory which was constructed by the Austin Company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DEPENDABLE RUGGEDNESS
Bull Dog Industrial V-Belts are available in A, B, C, D and E sections, full range of lengths.
Fractional Horsepower (FHP) V-Belts are available in three standard sections, full range of lengths.

HERE'S WHY ALL INDUSTRIES ARE TURNING TO NEW BULL DOG V-BELTS

Industrial experts agree that the most important factor in improving productivity is better equipment. As a result, they're scanning new products eagerly and giving them thorough workouts. And BULL DOG V-BELTS are among the newcomers that have more than won their spurs in every trial.

It's typical of the 70-year BWH fame for precision that these V-Belts weren't put on the market till they'd been exhaustively tested in the field. BULL DOGS proved they had real tenacity. They gripped tighter, slipped less, stayed on the job longer. And here's the construction that accounts for this superior performance:

1. Exclusive Bull Dog Cord Section has higher tensile strength—able to carry the load and absorb shock.
2. Low Stretch, because exclusive Bull Dog Cords are processed in a new way. As a result there's less slippage, fewer adjustments, longer life.
3. Cool Running—thanks to quality-controlled compounds developed in BWH laboratories, which don't crack or deteriorate under severe flexing.
4. Wear-Resistant covers— made of bias-cut heavy fabric to protect heart of belt from dirt, grease, moisture.

Specify Bull Dog V-Belts on all replacements. You'll find they mean "More Power To You" every time.

HAVE YOU A JOB WHERE STAMINA COUNTS?

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Pulp and Paper Back to Normal
Department of Commerce Reports

▶▶▶ THE PULP AND PAPER business in the United States has largely completed its postwar adjustment and for the most part is back to normal, according to report from the Department of Commerce dated November 26.

Order backlogs have declined, mill allocations are mostly a thing of the past, and inventories of practically all grades are adequate, according to the Department's November Pulp and Paper Industry Report.

Most of the large new production expansions undertaken since the war are now complete, and the industry has made great progress in mechanizing its logging operations. In these circumstances, the report states, production can be expected to fluctuate with the general level of business activity, rather than to continue on the sharply rising course it has followed since 1945.

The Department's report notes that some mills raised prices on certain paper items in September and October. In a number of instances the advances were made by mills which had not raised their prices to market levels in earlier months.

Bureau of Labor Statistics price indexes (1926 = 100) for September show paper at 158.4, up 3.7 above August and 7.5 points above July. Trade reports, however, indicate some price cutting, confined largely to off-standard stocks, by some smaller wholesalers and a few mills. Paperboard prices, according to BLS data, declined to 165.6 in September, from 169.7 in August and 172.2 in July.

Table 1 was prepared by the Pulp and Paper Section, Office of Domestic Commerce, based on data from the Bureau of the Census and the Business Structure Division of the Department of Commerce.

Foreign trade in pulpwood, wood pulp, paper, board and products fell off in the third quarter of this year. Imports dropped to $175 million, from $192 million in the second quarter, largely as the result of decreased receipts of overseas wood pulp. Because of lowered prices and declining interest among United States buyers resulting from the current generally improved market pulp situation, it is not expected that fourth quarter aggregate imports will equal the figure for the last quarter of 1947. Exports also have shown a tendency to drop off, principally because of dollar shortages and import restrictions in the more important foreign markets.

Table 2 shows aggregate imports and exports for 1947 and 1948.

TABLE 1—U. S. Production of Paper and Board
(Thousands of short tons)

Period	1944	1945	1946	1947	1948	Per cent change 1948 vs 1947
1st quarter	——	——	——	5,192	5,497	+5.9
2nd quarter	——	——	——	5,318	5,654	+6.3
3rd quarter	——	——	——	5,108	5,374	+5.2
4th quarter	——	——	——	5,418	5,725*	+5.7*
Annual	17,183	17,371	19,278	21,029	22,250*	+5.8*

(*) Estimated by Pulp and Paper Section

14 JONES MAJESTICS installed at
Jones
E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.
Builders of Quality Machinery for Paper Mills
MANUFACTURERS AND DISTRIBUTORS IN CANADA WATEROUS LTD., BRANTFORD, ONT.

TABLE 2—Total U.S. Imports & Exports Paper Base Stocks, Paper, Board and Manufactures (Millions of Dollars)

Period	Imports 1947	Imports 1948	Exports 1947	Exports 1948
1st quarter	127	186	40	38
2nd quarter	159	192	44	37
3rd quarter	190	175	45	32
4th quarter	180		45	

Note: Date for 1948 preliminary.
Source: Bureau of the Census.

▼

BRITISH PAPER NOTES (October, 1948)

The gradual transition of the British Paper Trade to conditions slightly resembling prewar continues in a quiet and orderly manner and expectations of more liberal quotas in the near future for the several consuming sections of the Trade are anticipated.

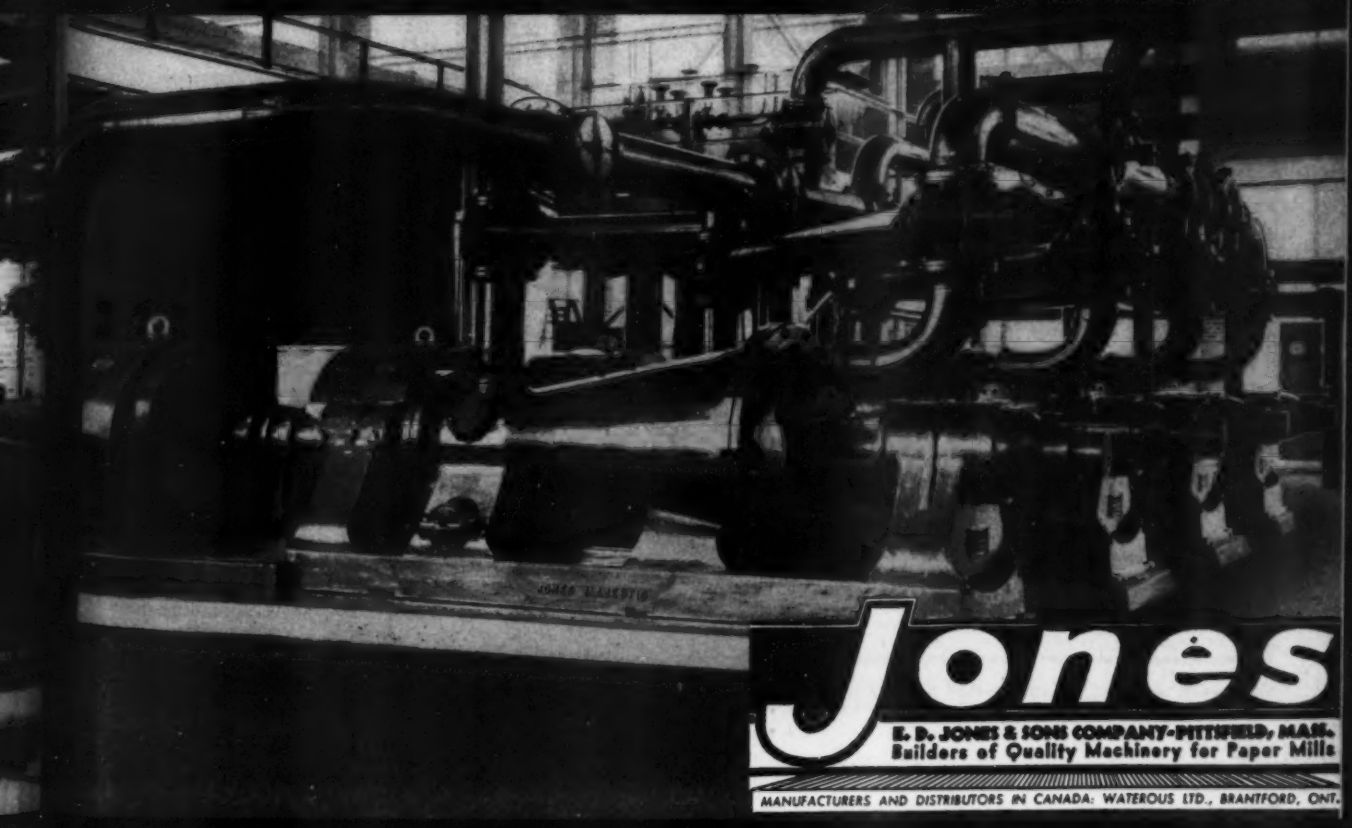
Supporting this anticipation is the sudden publication of a new Paper Prices Order which has resulted in price reductions for practically all classes of papers. Briefly, these represent £1-12-6 ton on mechanical papers, £3-10-0 ton on pure wood qualities (Cartridges £3-12-6) and £1-7-6 ton on esparto papers while the esparto body Massey Process coateds have been reduced by £1-7-6 ton and the wood body Massey coateds from 15/- to £2-15-0 ton according to mechanical pulp fibre body content. M.G. poster papers are down by 7/6 ton but nearly all qualities of boards, apart from printer's boards, have been increased in price slightly.

The most startling reduction is that of the pure wood papers. This £3-10-0 ton seems to be out of all proportion and unreasonable when considered against the present high costs of production and it remains to be seen if the Paper Control has any form of relief to offer the wood free mills. These new prices, however, have not adversely affected sales for present demand is far beyond Control permitted consumption.

Concurrently the permitted production of certain papers during the next license period (November-February) discloses that newsprint has been moved up to 45 per cent of prewar, the highest point it has reached since 1939, representing an annual production rate of 360,000 tons. At the same time it is announced by the Newsprint Supply Company that the Board of Trade is permitting the import of 80,000 tons of newsprint from Canada and Newfoundland during 1949. The same total as in the two previous years. Of this total 60,000 tons is to be taken during the first half of the year and the balance later. The Newsprint Supply Company has requested the North American suppliers to reserve a further 20,000 tons in anticipation that they may be permitted to import this if the dollar situation permits. As the North American newsprint production is still on the up grade, according to the latest published figures, this reservation should not present any difficulty. Against this the statement that the Argentine Government is to cut newsprint imports from 140,000 to 50,000 tons per annum points to a slight loosening of the past tight newsprint position and a more even distribution. European consumption generally is still a long way behind prewar.

Extra production is also to be permitted of mechanical papers, wallpapers, wood free qualities and M.G. posters as well as the specialised food wrapping papers and krafts. Extra consumption to cover this production is being granted to periodicals (quota is up by 14 per cent), trade papers, bag and box makers and other large consuming sections. Incidentally it is anticipated that receipts of strawboards from Holland, for boxmaking, which have been so seriously curtailed so far

at OUTHERN PAPERBOARD CORPORATION, Port Wentworth, Ga.


Jones
E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.
Builders of Quality Machinery for Paper Mills
MANUFACTURERS AND DISTRIBUTORS IN CANADA: WATEROUS LTD., BRANTFORD, ONT.

this year, will show a considerable improvement immediately.

Finally still greater freedom is being permitted in the execution of small orders of 30 cwt. of paper and 60 cwt. of boards based on sales earlier in the year and paper merchant's quotas for the execution of even smaller orders is being moved up to 100 per cent of 1940.

The improved pulp situation on this side is confirmed by the recent statement that Swedish exports of cellulose to Great Britain is to be increased from 250,000 to 315,000 tons and with the abolition of the levy on exports of Swedish wood pulp, which is expected to result in a reduction of 35/- ton on chemical pulp and 15/- ton on mechanical, some easing in cost to the British paper maker is looked for.

The immediate reaction to the improved production and consumption position is a feeling of uncertainty concerning the future but at the time of writing there is no slackening of orders, on the contrary purchasers generally appear to be anxious to avail themselves of the extra facilities.

▼

NEW WAXING EQUIPMENT INSTALLED IN NEPCO PLANT IN PORT EDWARDS

New waxing equipment has been recently installed, and is now in operation, at the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin. A variety of waxing operations can be performed on this new Dilts Miami 72-inch waxer, including wet waxing on either one or both sides of the sheet.

Grades now being treated on the new equipment include Nepco Waxed Locker Paper and Nepco Waxed Food Tissue. The wax locker paper is being received enthusiastically by paper merchants and locker plant operators throughout the country, and is available in standard counter rolls and convenient self-dispensing cartons. The waxed food tissue was recently introduced to the trade and initial shipments are now leaving the mills for markets throughout the land. It is available in interfold self-dispensing cartons in all standard sizes.

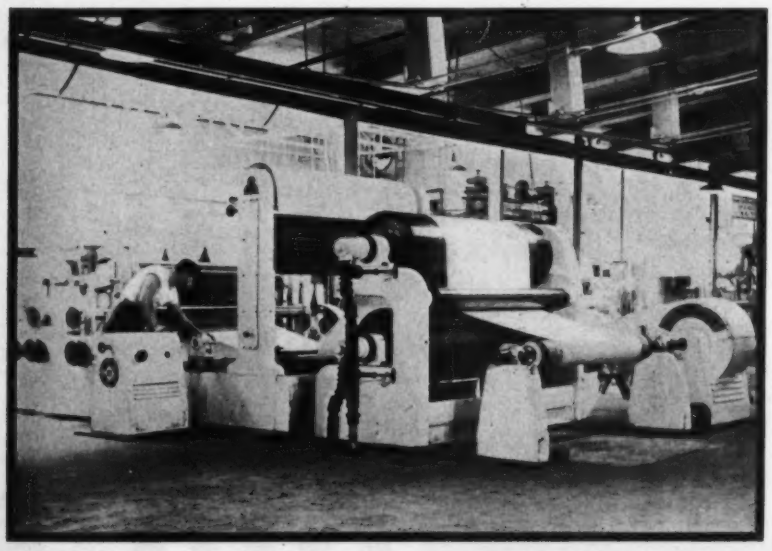
▼

JESSUP & MOORE PLANT BOUGHT AT AUCTION BY OSBORNE PAPER MILL CORP.

The sale by auction of the Jessup & Moore Paper Company, Providence, Maryland, for $224,750 was announced October 29, by Herbert I. Segal, president of Asset Realization Company, Newark, New Jersey, who conducted the auction.

Osborne Paper Mill Corporation, Fulton, New York, bought the entire plant for $175,000. About $50,000 was realized from the sale of 17 private homes on plant property. Mark Osborne, president of the Fulton company, announced he planned to keep the mill in operation on a reduced scale.

The Jessup & Moore Paper Company of Maryland was incorporated in 1934 and commenced business in January, 1935. It succeeded the Jessup & Moore Paper Company which was incorporated in Massachusetts in 1914. This company succeeded a Delaware corporation, and at the same time, absorbed two mills of the Kenmore Pulp & Paper Company.



New waxing equipment recently installed and now operating at the Nekoosa mill of Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin

Mr. Segal announced that the plant has a capacity to produce 115 tons of paper in 24 hours. The company specialized in book, multigraph, envelope and other papers. The plant equipment comprised four fourdrinier paper units up to 1110-in wide, and run in length up to 75 ft.

▼

▶▶▶ AN EXPLANATION of the newly-formed Washington Forest Products Institute and the program it hopes to carry out was given at Longview, Washington, recently by Herbert M. Peet, executive secretary of the group. Mr. Peet said that the Institute proposes a $260,000 program during the coming year which will include general research, a long-range raw materials survey for the forest products industry and a market survey of fibrous products.

▼

REQUEST FOR NEGOTIATIONS BETWEEN N.B. GOVERNMENT AND N.B. INTERNATIONAL CO.

A request that the New Brunswick government begin negotiations with the N.B. International Paper Company, Dalhousie, has been made in a resolution formulated at a joint executive meeting of all labor unions in the Dalhousie mill. The resolution was made with a view to provide more electrical power for the Dalhousie newsprint mill and for potential new industries which might locate in the area.

The resolution followed letters sent to the New Brunswick Electric Power Commission, asking that immediate steps be taken to improve the power shortage in the area, which has caused short-time operations at the Dalhousie mill each winter since its opening and often during the summer months. The lack of power affected not only the men employed in the mill, but approximately 10,000 residents of the province who are engaged in woodcutting, stream driving, processing and shipping the products of the company.

▼

PREMIERE SHOWING OF NEPCO SOUND-TECHNICOLOR MOVIES

A motion picture entitled, *The World Behind a Watermark*, has been completed by the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, and will be available within the next thirty days. The 35 minute sound and color movie has been under production for the past year and was completed in time for a premiere showing at the Nekoosa Bond Merchant's Dinner in Chicago, October 28.

Featuring professional talent from Hollywood and Broadway, "The

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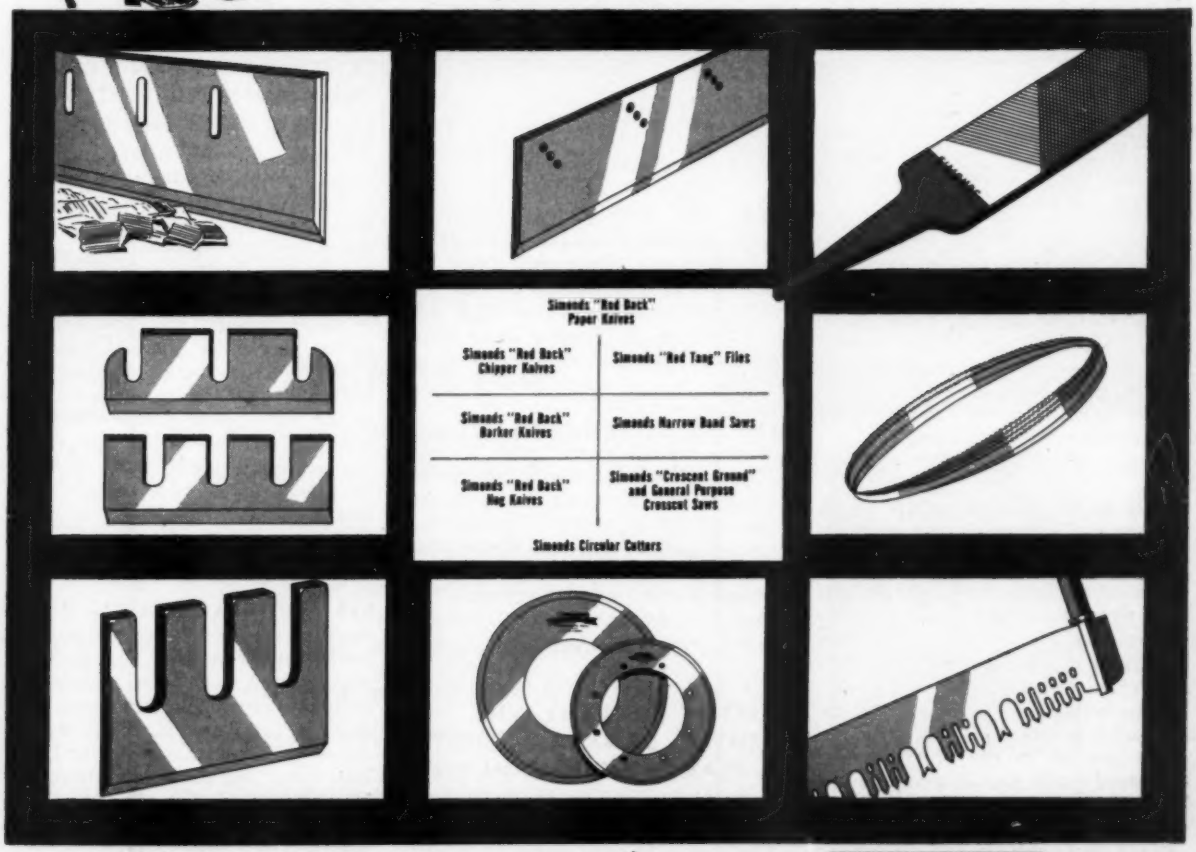
Simonds runs one of the world's top tool steel mills — to get special steels that are consistently good enough for Simonds Cutting Tools.

Simonds originates special methods and equipment to harden, temper, grind and finish these tools so that they will deliver an honest day's work, day after day.

And overseeing every operation are seasoned Simonds men . . . many with 20, 30, and 40 years of daily living with this hard-and-fast rule: "Simonds makes *first quality only.*" And by way of keeping a running check on that quality, *they use Simonds Tools to make Simonds Tools!*

So rest assured that your cutting-tool dollar is *invested* — not spent — when you order Simonds from your dealer.


Simonds "Red Back" Paper Knives
Simonds "Red Back" Chipper Knives
Simonds "Red Tang" Files
Simonds "Red Back" Barker Knives
Simonds Narrow Band Saws
Simonds "Red Back" Hog Knives
Simonds "Crescent Ground" and General Purpose Crosscut Saws
Simonds Circular Cutters

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World Behind a Watermark" was filmed on the Nekoosa-Edwards properties, including the Canadian pulpwood tracts, the forestry nursery, Nepco Lake, and the mills at Port Edwards and Nekoosa, Wisconsin. Additional scenes were filmed in St. Paul, Minnesota, in the studios of Reid H. Ray Film Industries, Inc., producer of the picture.

Nekoosa sales representatives will be supplied with a projector and a print of the film for showing to distributor sales meetings. Distributors of Nekoosa paper who are interested in showing the movie to their printer customers, may secure a print of the film upon request.

▼

▶▶▶ AFTER ALTERATIONS have been completed, the Fibreboard Products, Inc., San Francisco, California, a packaging and container manufacturer, has announced it will move its head offices to the San Francisco division plant about April 1. In the new offices the company will have two and a half times as much space as at its present location, the Russ Building, with a floor area of 40,000 square feet.

▼

▶▶▶ THE ANNUAL MEETING of the Masonite Corporation was held at the First American State Bank building, Wausau, Wisconsin last month. Ben O. Anderson, Chicago, Illinois was elected as a new member of the board of directors. All other officers and members were re-elected.

▼

TWO MORE STATES JOIN TREE FARM SYSTEM—23 TOTAL

Outstanding woodland management of privately owned land received official recognition as two more states, Georgia and Massachusetts, joined the American Tree Farm System. The addition of these two states brings the number to twenty-three states officially cooperating in the national movement to assist owners in the profitable and perpetual production of wood for use.

Massachusetts' affiliation with the program brings the Tree Farm System into New England for the first time. The program is sponsored jointly by the State Department of Conservation and the Forestry Department of the State University.

Georgia, unlike Massachusetts, is not pioneering in its area. Georgia is the tenth southern state to join the American Tree Farm System, and southern land owners now constitute approximately four-fifths of the nation's Tree Farmers, and control about two-thirds of the total certified acreage.

J. C. McClellan, assistant forester for AFPI says the addition of the Georgia and Massachusetts woodland, plus new certifications in previously organized Tree Farm states, brings the total acreage up well above the 16,000,000 mark.

▼

NEW PAPER PRODUCTS PLANT BUILT BY MARATHON CORP.

Construction of a modern manufacturing plant by the Marathon Corporation is going forward rapidly at Wausau, Wisconsin. It is expected the new paper products plant will be ready for operation next summer.

The new building will have a total floor area of more than 225,000 square feet and will provide manufacturing facilities, warehouse and office space. It will be of most modern design and will contain the latest type of equipment to facilitate manufacturing under sanitary conditions.

This is a major step in rounding out the expansion and modernization program initiated by the company several years ago.

▼

▶▶▶ AN EXPANSION program has been launched by the Seybold Paper Company, Cincinnati, Ohio, to facilitate service within a 50-miles radius of Cincinnati. Edward A. Amith and William A. Harthun have been appjointed new sales representatives.

▼

▶▶▶ REPLACING ALL outmoded or worn out machinery, the St. Helens (Oregon) Pulp and Paper Company is engaged in a modernization program that will cost $1,500,000. Three of the seven paper bag machines ordered by the company already are in production, while the others are expected soon. Included in the reconversion work are new digesters and a new boiler.

▼

BRITISH COMPANY WILL ENTER CANADA — FIRST PLANT AT HAMILTON, ONT.

Establishing their first entry into the Canadian field, the John Dickinson Company of England, one of the largest manufacturers of paper products in the world, has selected Hamilton, Ontario, as the location for their temporary plant and, later, for the erection of their main industry. This was announced by P. W. Gordon, president of Consolidated Specialties Ltd., whose plant on Burlington Street East has been purchased by the English company.

The John Dickinson Company (Canada) Ltd., as the Hamilton branch is to be known, will take over the staff of Consolidated Specialties. It is believed, that, eventually, the industry will employ possibly 1,000 persons. The company has also taken an option on 15 acres of land in the northeast industrial area.

The John Dickinson Company, Ltd., of England, is the largest concern of its kind in the British Empire, having nine mills in England, one in Australia, and one in South Africa.

▼

▶▶▶ A SPACIOUS NEW office of the Hammermill Paper Company is now located on the 35th floor of the Chanin Building, 122 East 42nd Street, at Lexington Avenue and 42nd Street. Telephone number is Murray Hill 9-6424. Hammermill's former New York City location was at 50 East 42nd Street.

▼

CONTINENTAL CAN CO.'S NEW PLANT PURCHASED BY NEW YORK LIFE INS. CO.

Purchase of the Continental Can Company's new plant at Brigton Road in Tonawanda, has been made by the New York Life Insurance Company. Simultaneously, Continental Can has leased the factory on a long-term net rental basis.

This is the fourth property purchased by the New York Life and leased to Continental Can under an agreement made in 1946.

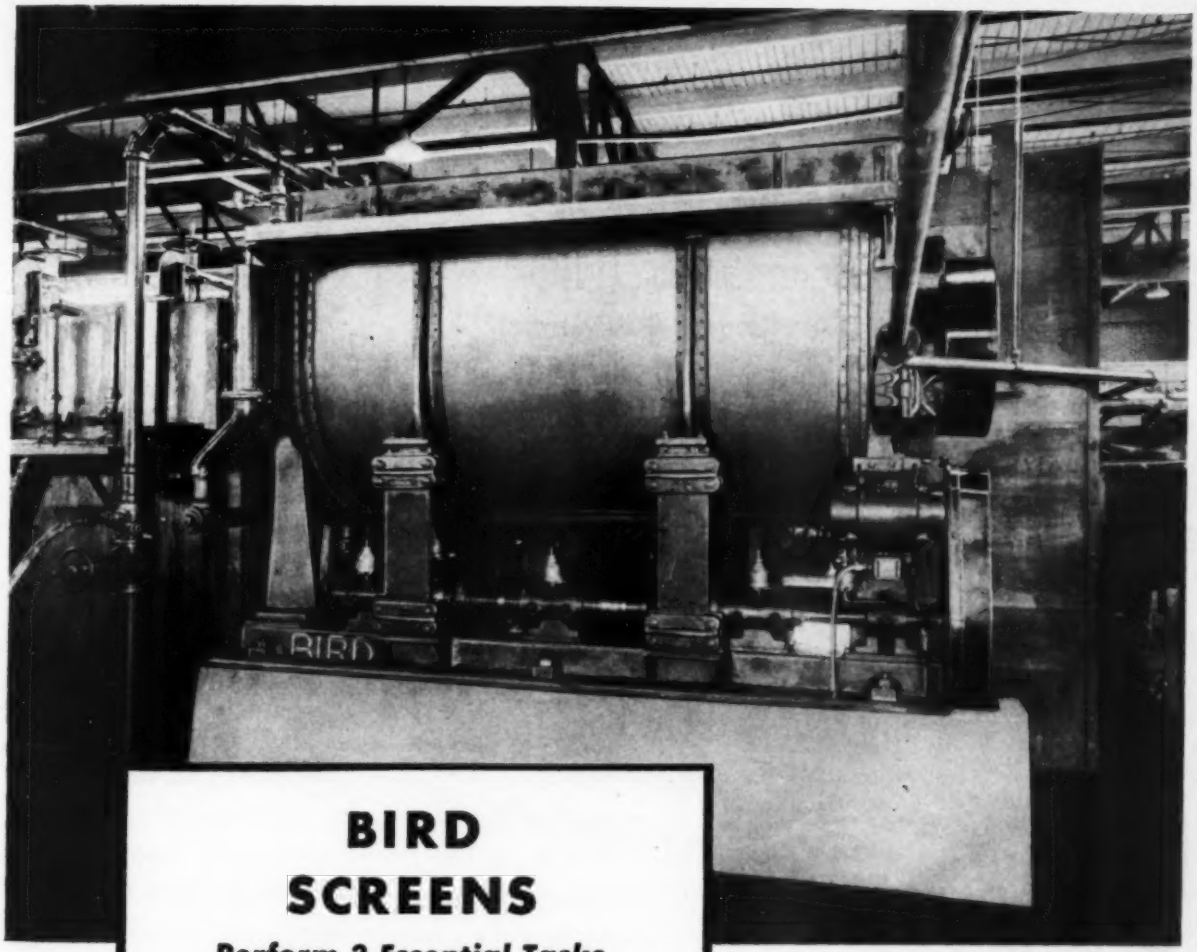
The Tonawanda plant, costing unwards of $1,000,000, is practically completed and is being made ready for the production of fibre containers. It contains 20,000 square feet of space and is on a 40-acre site.

▼

▶▶▶ THE WOODLANDS department of the Gould Paper Company, Lyons Falls, New York, has been engaged during the past summer in building a new logging road into a new area on, and around, Little Moose mountain. The road begins at Limekiln Lake, and travels southeast for about eleven miles into the Otter Creek valley and the watershed of the south branch of the Moose River.

▼

▶▶▶ LOOKOUT TOWERS are being added throughout the counties of Georgia with organized protection units. This forest fire detection system is operated by the Georgia Department of Forestry in Atlanta. One of the towers has been completed atop Ranger Mountain in Gordon County and another is under construction in Wilkinson County. Twenty others are in order for various counties.



BIRD SCREENS

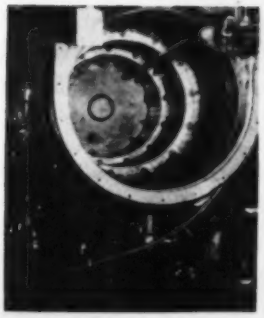
Perform 3 Essential Tasks Ahead of Your Paper Machine

1. They deliver clean stock up to the limit of paper machine capacity.

2. They comb, straighten and individualize the fibres, assuring good formation at maximum machine speed.

3. They deliver stock free of strings, lumps and slime — uniform in weight.

BIRD MACHINE COMPANY
South Walpole, Massachusetts



The Bird Oscillating Shower, driven right from the Screen itself, keeps the screen slots clean and open with extremely small volume of shower water. Many mills are putting it in existing Screens and cashing in on immediate and substantial savings and operating advantages.

90% OF ALL THE PAPER MACHINES IN NORTH AMERICA ARE EQUIPPED WITH BIRD SCREENS

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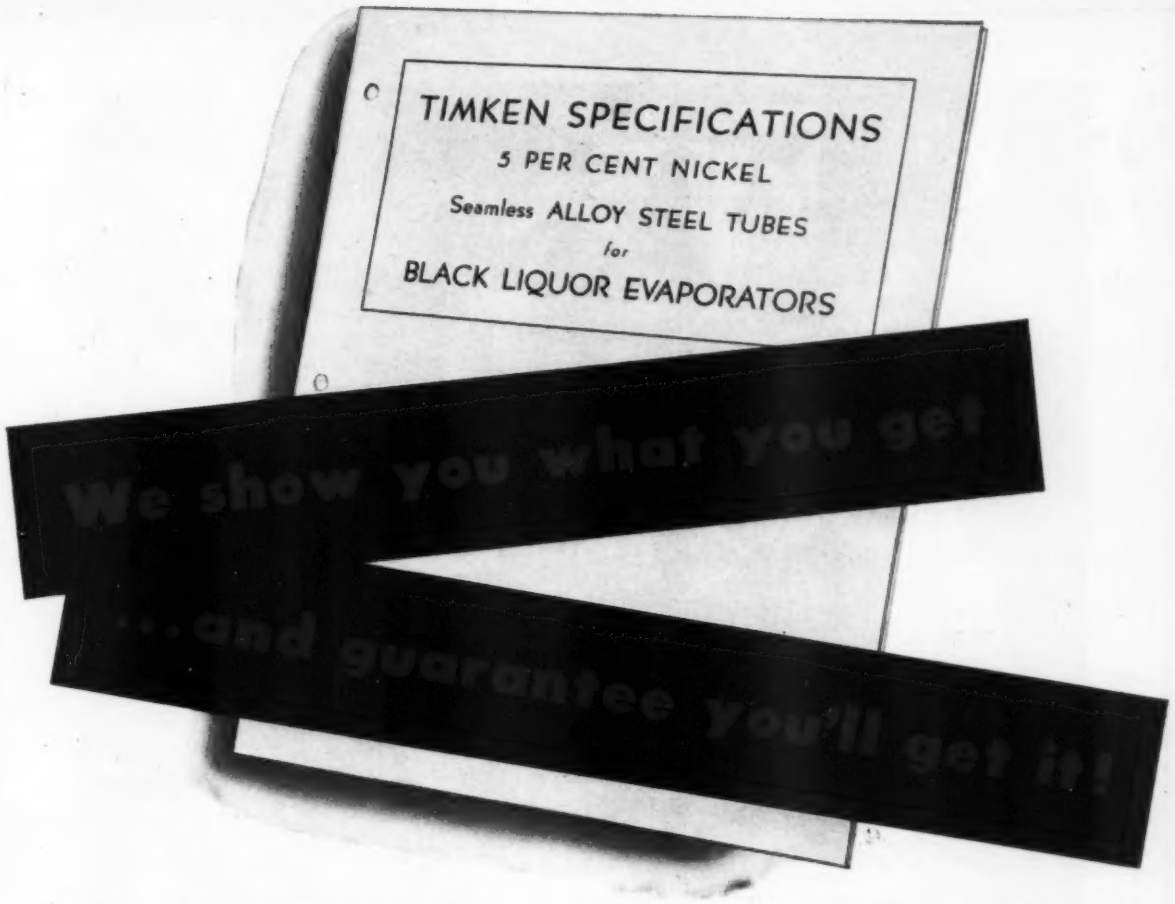

WHEN you buy Timken® black liquor evaporator tubes, our complete specifications tell you exactly what you're getting. They cover every essential point—chemical composition, physical properties, tolerances, inspection methods, and many others.

And Timken 5% nickel tubes are *guaranteed* to meet every one of these specifications. There's no guesswork about the quality of the tubes you're buying. You're *sure* of maximum tube life per dollar invested.

Timken 5% nickel tube specifications have been used by leading pulp mill operators for many years. By using Timken tubing made to these specifications, mill operators have been able to cut the cost of black liquor corrosion three ways: less downtime; lower tube replacement costs; longer tube sheet life.

If you'd like to see a copy of Timken specifications for 5% nickel tubes, we'll be glad to send you one without cost or obligation. Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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With the invention in 1881 of the halftone plate, there was urgent need of a paper with a smooth printing surface. One who sensed that need was Martin Cantine, 18-year-old star paper salesman. Why, he thought, could not a fine white coating be applied to paper, like that prepared for lithographed playing cards? Visiting a playing card factory, he saw workers brushing a clay solution on cardboard sheets by hand. Shortly after his historic visit, he bought the company, hired its skilled workers and in 1888 built at Saugerties, New York, one of the first mills for coating paper by machine.

Martin Cantine's vision and enterprise, followed by advancements in paper coating processes, inks and presses, gave great impetus to book and magazine publishing; led to the fine-quality halftone and color printing of today. It was one more milestone in the development of the essential paper industry.

The dramatic story of paper is told in the sound-and-color film, "Paper — Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

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HUYCK *Felts*

Close to ground felling saves waste

Fast bucking and under cut bucking

Limbing from any position

Z-Z-Z-Z-I-N-G
and down it goes!

...fast, easy, and at a saving with the

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ONE-MAN CHAIN SAW

WITH MERCURY GASOLINE ENGINE

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Wherever used you can count on dependable performance, long life and low cost maintenance.

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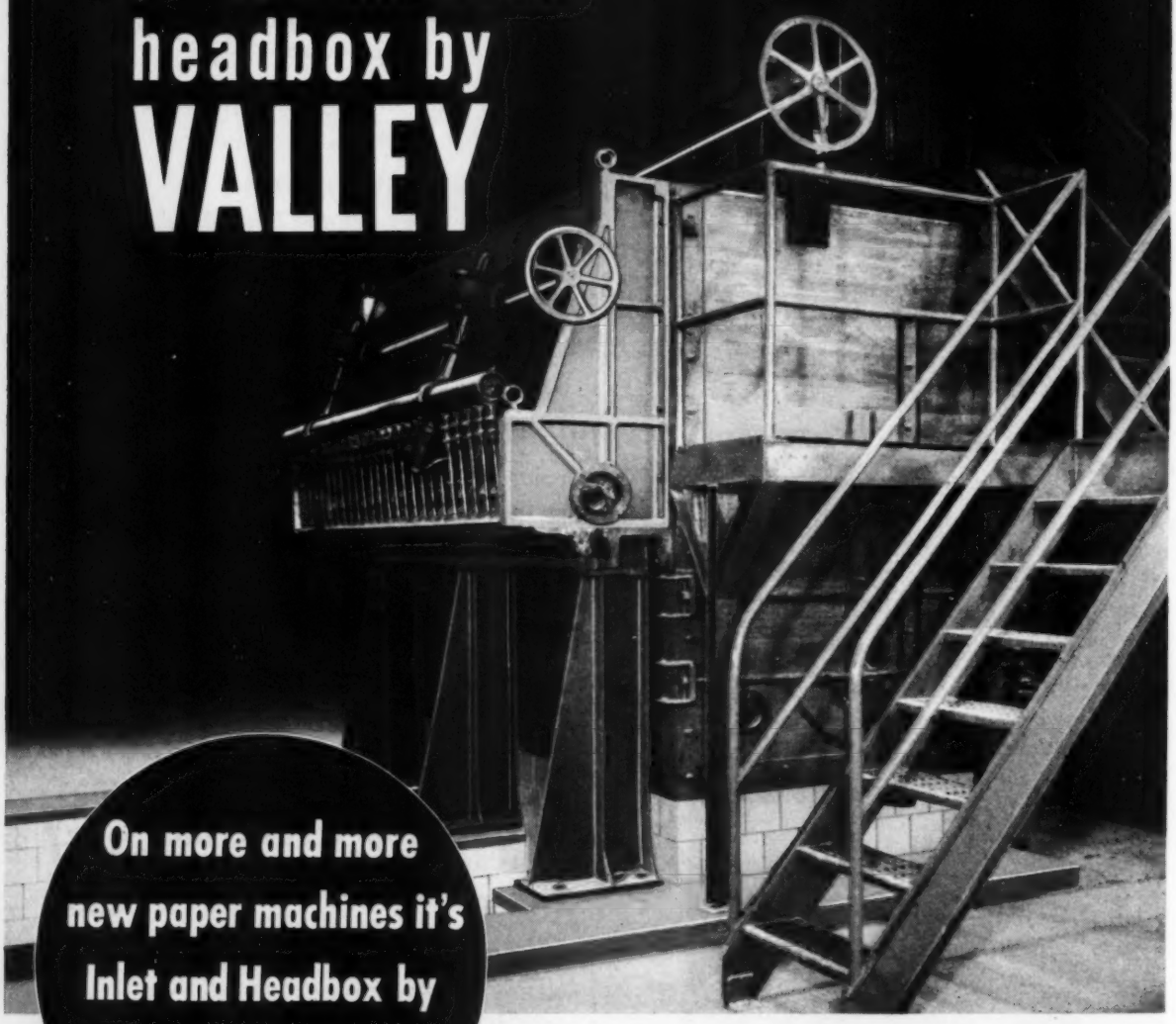
OXFORD PAPER CO's New No. 12 Machine

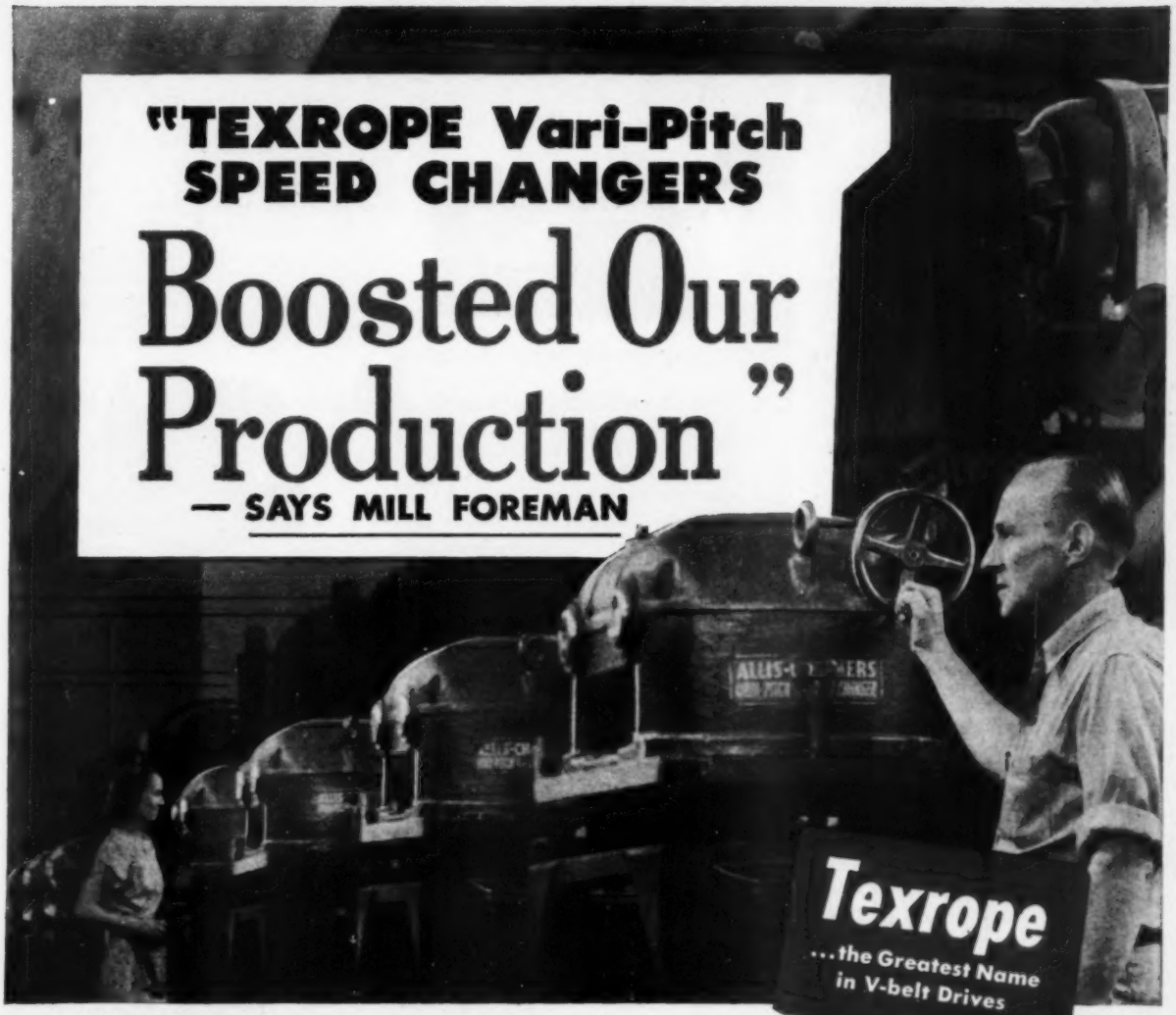
. . . it's inlet and headbox by VALLEY



On more and more new paper machines it's Inlet and Headbox by VALLEY

VALLEY IRON WORKS CO.
Appleton, Wisconsin

FORMATION CALIPER LEVEL SHEET INCREASED SPEED HIGHER TEST



"With these clean, compact units, we can change speeds without stopping ...get in-between speeds we need."

FOR GREATER MACHINE OUTPUT in *your* plant, get the same variable speed drive that makes mill foreman Ralph Finkboner of Rochelle, Illinois, so enthusiastic. Texrope Vari-Pitch Speed Changers give you smooth, accurate speed control at the turn of a crank. You operate your machines at *exactly* the right speed for highest production.

V-belt drive cushions Texrope Vari-Pitch Speed Changers against shock loads. Design is simple, compact, smooth running and easy to keep clean. Capacities range from 1 to 75 HP with stepless speeds up to 3.75 to 1.

Texrope Authorized Dealers and Allis-Chalmers District Offices have at their command the greatest V-belt experience in the industry. Consult them and be *sure* of the best drive for your particular need. Listed in SWEET'S. A 2541

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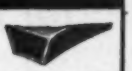
A Complete Range of Products		
Super-7 V-belts	5 types . . . sizes to suit every power transmission job	
Texsteel, Texdrive, Magic-Grip	Sheaves in a full range of sizes and grooves	
Vari-Pitch Sheaves	Exact variations in speed — Stationary or Motion control	
Speed Changers	Speed variations up to 375% at the turn of a crank	

Texrope Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices.

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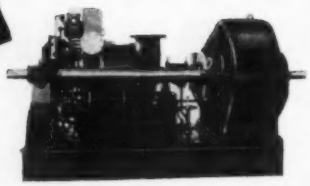
Originators of the Multiple V-belt Drive for Industry

3 *Ways To More And Better Paper At Less Cost*

TYPICAL ARRANGEMENTS OF WORTHINGTON STEAM TURBINE PAPER MACHINE DRIVES

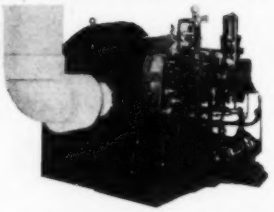
1.



DOUBLE END DRIVE—Extremely compact, ideal for limited space. Also reduces torsion stresses, an advantage when load is increased beyond original plan. Easily fitted into existing setup by removing section of back line shaft connecting each end of drive to line shaft by flexible couplings.

SINGLE END DRIVE—Where required, this type can be direct connected to end of line shaft. Is space-saving, positive-acting and eliminates power losses, maintenance expense and hazards of belted drives.

2.



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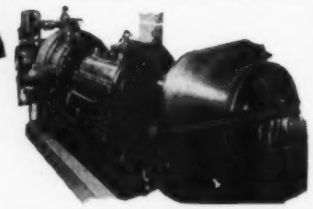
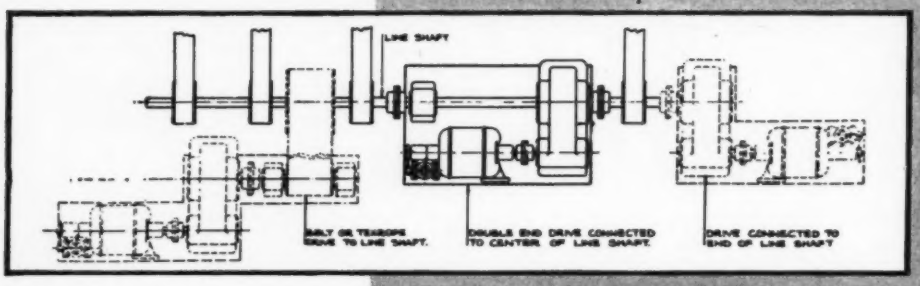


BELTED DRIVE — Furnished wherever conditions require. Units consist of turbine, reduction gear and pulley, on baseplate. Pulley, on separate shaft, is connected to gear by flexible coupling. The most satisfactory drive in many cases, especially with small hp's. Changeover can be made in a few hours.


LINE SHAFT
BELT OR TURBINE DRIVE TO LINE SHAFT.
DOUBLE END DRIVE CONNECTED TO CENTER OF LINE SHAFT.
DRIVE CONNECTED TO END OF LINE SHAFT

Showing how power may be applied at center of line shaft (Double End Drive), at end of shaft (Single End Drive) or by belt (Belted Drive).

Get The Most From Your Machines

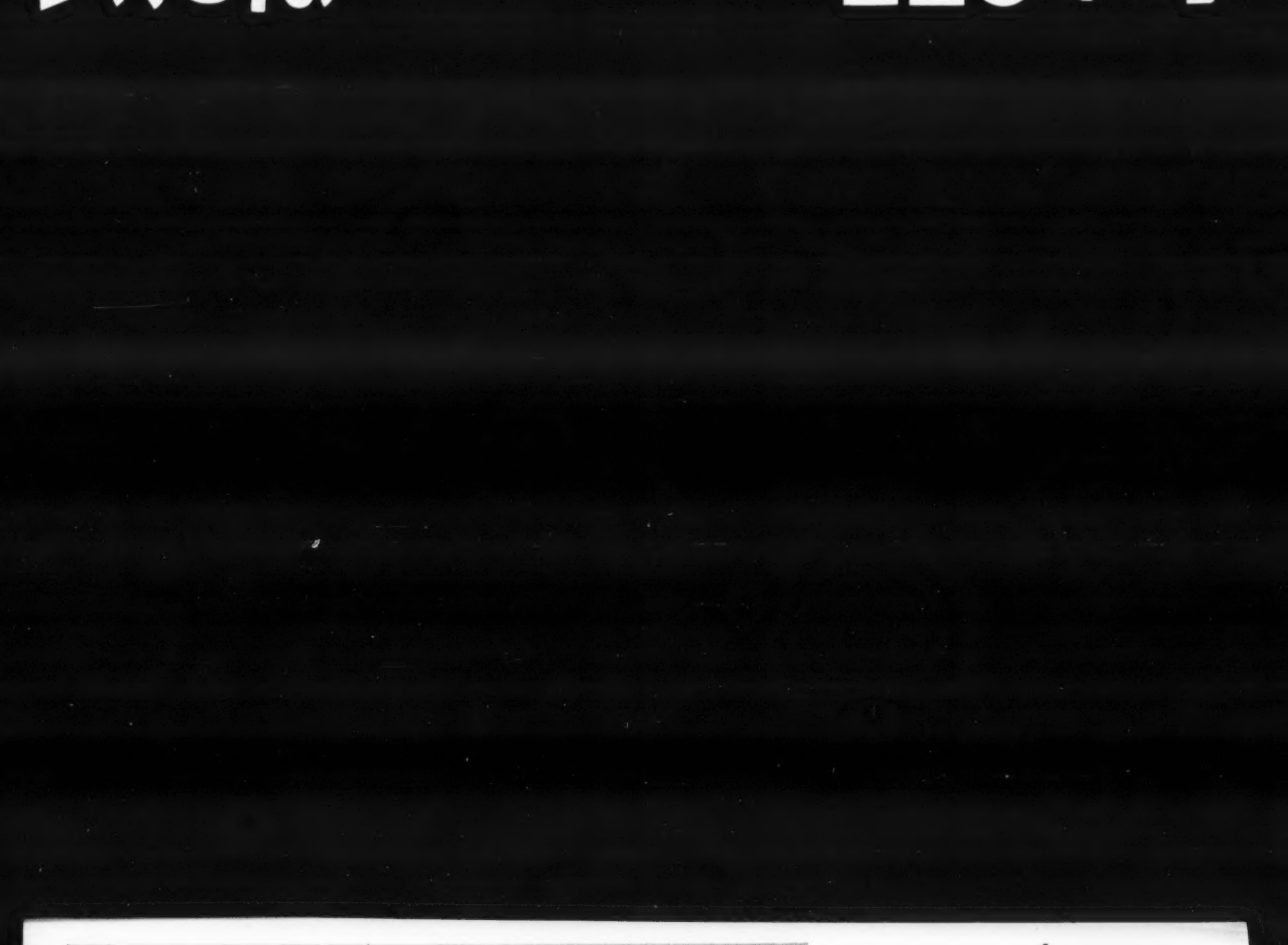
Take advantage of Worthington's long, successful experience in engineering paper machine drives. Get steadier, higher, more accurately controlled speeds, for bigger and better production. Get the efficient design and sturdy construction that assure long, trouble-free, low-cost service . . . And get the facts proving *there's more worth in Worthington.* Write to *Worthington Pump and Machinery Corporation, Steam Turbine Division, Wellsville, N. Y.*

WORTHINGTON

Steam Turbines

T8-8

A GREAT TEAM IN STEAM



United States Paper Exports Under the ECA Program

▶▶▶ THE STATUS OF paper exports under the European Recovery Program heads the list of important matters up for consideration by pulp and paper mill management. Following a conference of officials of the Economic Co-operation Administration, held recently in Washington, The American Paper and Pulp Association's Export Committee Secretary, Eric Lagerloef, who attended the meeting, briefed the following facts relevant to the United States paper exports under the ECA Program:

The Committee's Secretary was advised that—

1) Paper and paperboard are in sufficient supply in this country, and, therefore, ECA approval of purchases can be reasonably assured for most grades, unless the procurement request be of such size as to cause a shortage in this country. In such a situation, the request would be modified proportionately.

2) Export sales to countries participating in the European Recovery Program must be initiated by the domestic mills' European Agents, since request for ECA funds must be made by the participating nations based on the purchase requirements submitted by those agents.

3) Upon approval by the foreign government for the expenditure of ECA dollars for paper, the Paris Office of ECA screens the requests and transmits them to Washington where they are further reviewed in the light of available supply here.

4) If payment for an export transaction is to be made in ECA funds, the importer must initiate action. He must file with his government the necessary papers, and then his government will decide if the grade of paper or paperboard is necessary to that country's recovery program, and if the quantities involved can be covered in that country's import quota. Also, conditions of sales must be determined by the foreign government, whether paper can be procured through normal trade channels, without utilization of ECA funds, and whether the transaction will insure a reasonable return for the dollar expenditure.

5) The foreign agent could contact his government to determine what grades of paper and/or paperboard would be considered essential under that country's recovery program and the tonnage needed, and advise his U.S. supplier accordingly to see if such grades and tonnage would be available.

▼

4-H Forestry Project

▶▶▶ AN IMPORTANT contribution to the forestry work of the 4-H Club has been made by the American Forest Products Industries, Inc. This organization has provided awards in the form of scholarships, trips to the National 4-H Club Congress, and medals to those whose achievements are noteworthy. Such incentives stimulate interest in forestry, and, quite as important, build character.

Last year over 20,000 boys and girls participated in forestry projects covering approximately 200,000 acres. While this may seem small compared to other national reforestation programs, the job that is being done in vocational training and the education of the young people of the nation is of inestimable value.

This is indicated by the scope of the 4-H Forestry Program's objectives: (a) To develop desirable attitudes toward the need and importance of conserving our forest resources in relation to the public welfare; (b) to appreciate the importance of the farm woodland as a source of income and as a source of raw material for the industries of America; (c) to acquire information and an understanding of good forestry practices and skill in executing them; (d) to learn how to manage a tree farm for continuous production of forest crops; (e) to understand the importance of "keeping America green" by preventing forest fires; (f) to develop leadership in forestry by demonstrating to others better practices in growing, protecting, and utilizing farm timber.

These objectives lead to the development of capable, responsible citizens. They will also create an appreciation for the nation's greatest crop. Participation in this 4-H award by the pulp and paper industry would be a step toward saving our natural resources.

▼

A Step Toward Lower Taxes

▶▶▶ THERE APPEARS to be growing disquietude over the huge federal budget. Many people, considering the public welfare, feel that continued government spending on the large scale of the last few years can only lead to trouble. And from a personal standpoint, nearly everyone would welcome some relief from the present high taxes.

But where can we cut down? Certainly not in the realm of necessary and desirable outlays such as essential government services and expenditures for our national safety.

However, Congress took one important step in the right direction when it set up the Commission on Organization of the Executive Branch of the Government, known as the Hoover Commission, and gave it full authority to search for a solution to problems that have long vexed our legislators as well as our presidents.

The Commission will make a series of reports to Congress within 90 days after the 81st Congress convenes on January 3, 1949. It is expected that the Commission will recommend ways (1) to limit appropriations to the lowest amount consistent with the efficient performance of essential services; (2) to eliminate duplications and overlapping of activities of a similar nature; (3) to abolish services, activities and functions not necessary to the efficient conduct of the Government; (4) to define and limit executive functions, services and activities.

In view of President Truman's approval of this work, it would appear that at least some of the Commission's recommendations will have a good chance of becoming effective.

killed in 1882. His
frank died in 1915.
er and the Penicks spend
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fever dub a dry hole, though,"
elder Penick says
the course of the long se
ter found a small amou
bullion at Cement, Okla., 40
s northeast of here. This, he
ves, was planted by the wily
s boys to throw the unwary
e trail.
timers here recall that
James wore out six horses
honor of being selected as the geographical center of the world.
The U. S. Coast and Geodetic Survey says that a vast project to measure the size and shape of the earth will start from the small marker on the Meade ranch near Osborne.
marker, which is the geodetic center of North America.
For years the marker has been the starting point of all surveys in the nation.
From the White House to the most unpretentious barn, all build-
existing situation in regard to automobile headlights as a "serious factor against safety, courtesy and law."
The survey showed that about a third of drivers at night either forget or refuse to dim their headlights for approaching cars.
inadequate, has not nearly kept pace in safety and efficiency with other automotive improvements.
2. Too many drivers are lax in dimming their lights.
3. Hazards of night driving are greatly increased by the large
George L. Schubert, re
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pleaded innocent to a charg
passing worthless checks. J
Sweet remanded Schubert for
on bail of $1,500, not furnis
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assed four worthless check
Kalamazoo. All were draw
John W. Free State bank of
Paw.
Otto K. Buder and
tain of Detectives Frank P
brought Schubert to K
March 29 from S
BETWEEN THE LINES

Let's Bow to a Changing World...

But "Keep Christmas"

▶▶▶ WHEN THE CLOCK goes around too fast for us, that cuckoo pops out of the subconscious and says "I must do that tomorrow." Yes, that goes on for a few months, but when the days grow shorter and new calendars begin to come through the mail, we grow reflective. Sometimes the balance sheet of the year's activities looks all right, then again it lops over to one side—on the ledger it would be red.

The divisible-by-four years show more entries than some of the others. The extras include one more day in February and a presidential election. Some questions are still asked as to how and why, and opinions advanced that the men who have made polling a profession will need to get jobs keeping scores on something or find out why their poles didn't hold that line.

The mental laziness of the masses has been underestimated. Human beings don't read or make up their own minds as much as they did some years ago. They don't need to. They sit in the easy chair and relax while radio commentators and spielbusters tell them exactly what is what. Did you ever watch a carful of commuters going over the morning paper on their way to work? They read some headlines, turn pages, scan half the page; but you can always tell when they come to the comics. That night they listen to a broadcast telling them that so and so says this and that—they could have read it in the morning paper.

That old warning—*Stop, Look, Listen!* winds up with a big following nowadays. It even takes the edge off the old proverb about a picture being worth ten thousand words. But realistically, a picture *did* get big notice when the flag on the New York Stock Exchange flew at half mast the day after election. Some stocks went off from 2 to 6 points. But—the flag was low out of respect to a deceased member of the Board.

▶▶▶ OUR FAITH in the historical writings of great men of letters makes us wonder how much we should believe. A recent disillusionment is that men of science have delved deep into history and fathomed the depths of the Atlantic Ocean to find out what happened to the lost continent. But after many years spent in research and subterranean exploration—to say nothing of the financing—the only history they have made is to be convinced that there never was an Atlantis; therefore, no continent ever was lost. Students of tomorrow may not have to spend so much time with the writings of Plato and other ancient seers. Which brings us to a case in point of one small fry, who, when told there really was no Santa Claus, remarked: "Now that I know there isn't any Santa, I've got to check on a lot of other people I've heard about."

▶▶▶ NO OUTSTANDING contribution was made to the cause of world peace in 1948—at least that has been established by the board considering applicants for the Nobel Peace Prize for this year. They did not feel that any one person had performed outstanding effort that would entitle him to the award. One commentator conducted a poll to learn who certain groups felt might have been considered for the Peace Prize. First among those mentioned was the simple man of India, Mahatma Gandhi. The reason given for his nomination was that he not only worked for peace, he gave his life for it.

The same supreme sacrifice was laid upon the altar of world peace by a host of American men in war combat, plus an undetermined number who gave the same offering beyond the line of duty. America has given a great army of its beloved manpower and has dug deep into its coffers that the world might have peace. What could be more fitting at this Christmas Season than that peace should come to Palestine! As this is written, the news flashes that fighting has ceased in the Holy City.

▶▶▶ WORLD STRIFE or even problems within our own land seem to have cast no shadow over the Christmas shopping throngs that began jamming stores in the large cities before Thanksgiving Day. Each year, Santa Claus comes to town a little earlier. If this goes on, the next few years will see not outdoor Christmas trees, but lawn parties for Christmas, and the seasons will be all mixed up.

These commercial threats may put the real spirit of Christmas out of business. Why not start a movement to declare a moratorium on Christmas gifts just one year and try a real old fashioned Christmas. Most of us have been inspired and lifted up by singing Christmas carols around the glittering tree, but who can feel Christmassy when, before you have taken home your Thanksgiving turkey, you hear "Jingle Bells" blaring from every record department of every store you enter.

▶▶▶ THAT STAR is just as bright as ever, and man would better keep his eye in that direction more than before. That is one ray man will never learn how to divide; one that has led the people of the earth from idolatry into the brightness of life and understanding. The mind of man has brought many things to the world, but it always has been done in the bright light from that star.

—By Bessemer

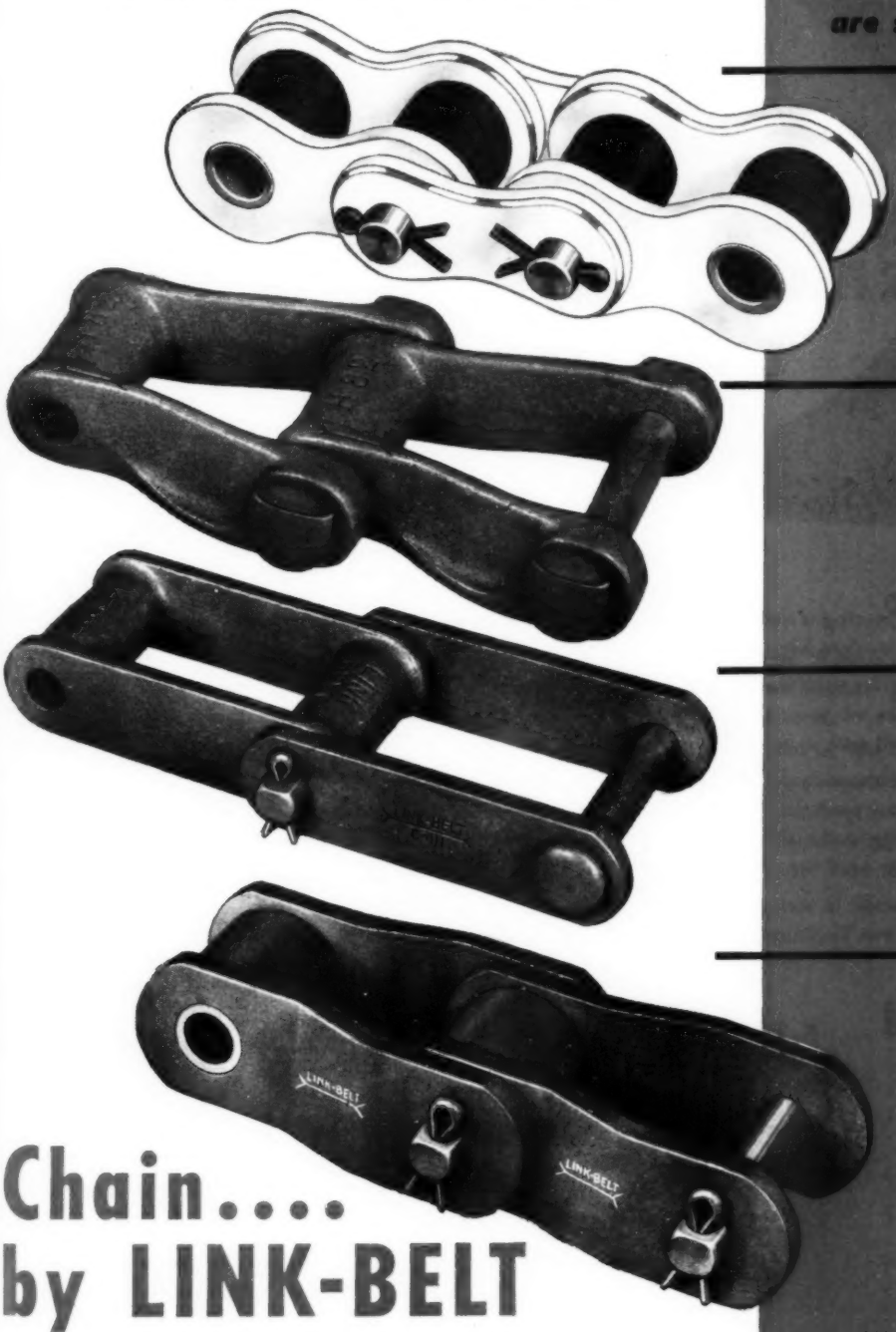
LINK-BELT

draws upon its 73 years of chain making experience to serve you better

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8.
Offices, Factory Branch Stores and Distributors in Principal Cities.

A few of the many types of Link-Belt chains for power transmission and conveying are shown here.



SILVERLINK ROLLER CHAIN

An accurately made finished steel roller chain of high tensile strength and excellent wear value, made to ASA standards. Made in pitches ½" to 3" in single and multiple widths for drives to 1000 H.P. and above and various attachments for conveyor applications. Stock sizes.

"H" CLASS PINTLE CHAIN

An excellent, inexpensive chain for conveyors that slide. Links are straight on top and bottom for full-length sliding contact, and broad, flat wearing shoes provide extra sliding surface while shielding the ends of pins or rivets.

Available in a variety of plain chains and attachments.

"C" CLASS "COMBINATION" CHAIN

This chain combines two types of link construction into an unusually economical chain assembly. Center links consist of simple, rugged castings. Sidebars are made from strong bar steel. A popular, durable, low-cost design for elevators and conveyors. Variety of attachments available.

"SS" CLASS STEEL ROLLER CHAIN

Used for medium and heavy duty drives operating at speeds up to 700 feet per minute. Made in various sizes with offset or straight sidebars, with or without bushings or rollers, for a wide range of applications with ultimate strengths up to 375,000 lbs.

Chain.... by LINK-BELT

KELGIN *smoothes the way...*

FOR

PERFECT PRINTING CONTROL

*P*rinting is under full control when it's done on paperboard prepared with Kelgin, the modern algin surface sizing agent.

Kelgin gives you a surface that is uniformly smooth — makes possible *controlled penetration* of printing inks, oils and waxes. Full ink brilliance, clean sharp printing and true, even color values are assured.

Kelgin is equally soluble in both hot and cold water — is completely adaptable to water box application in the calender stacks. It will not cause foaming, picking or sticking to the rolls. With Kelgin, also, you reduce the curl tendencies of sheets without the need for sizing the back of the sheet.

Full details in terms of your particular application will be sent on request. Write to our Technical Service Department.

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Tile Chest *78 feet long*

another use for **KALAMAZOO GLAZED TILE**

Inside view of a Tile Chest in course of construction, 78 feet long, 17 feet wide and 14 feet high.
Propellor agitator is located at each end.
The slick glazed walls assist agitation in this big chest and it is easier to keep clean as it can be quickly flushed down with a hose.
Kalamazoo Glazed Tile has many decided advantages for large, capacity chests.

KALAMAZOO TANK and SILO CO.
KALAMAZOO, MICHIGAN

Everything in power piping ...on One Order to Crane

Take This Turbine Piping, for example. Every item in the system—valves, fittings, accessories and pipe—is from Crane, the world's leading supplier of industrial piping. Whether it's piping for power, process, or general service installations, there's no need to search further than the complete Crane line. Everything's in **One Catalog**—an unequalled selection of brass, iron, steel and alloy materials. **One Order** to your local Crane Branch covers all equipment needed for the job.

Complete selection and availability are not the only advantages in dealing with Crane, however. To standardize on this **One Source of Supply** is to simplify every piping procedure, from design to erection to maintenance work. **One Responsibility** for all materials helps you get better installations, avoids needless delays. And in every item from Crane, **High Quality** is your best assurance of dependable performance from every part of your piping systems.

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Branches and Wholesalers Serving All Industrial Areas

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RESPONSIBILITY
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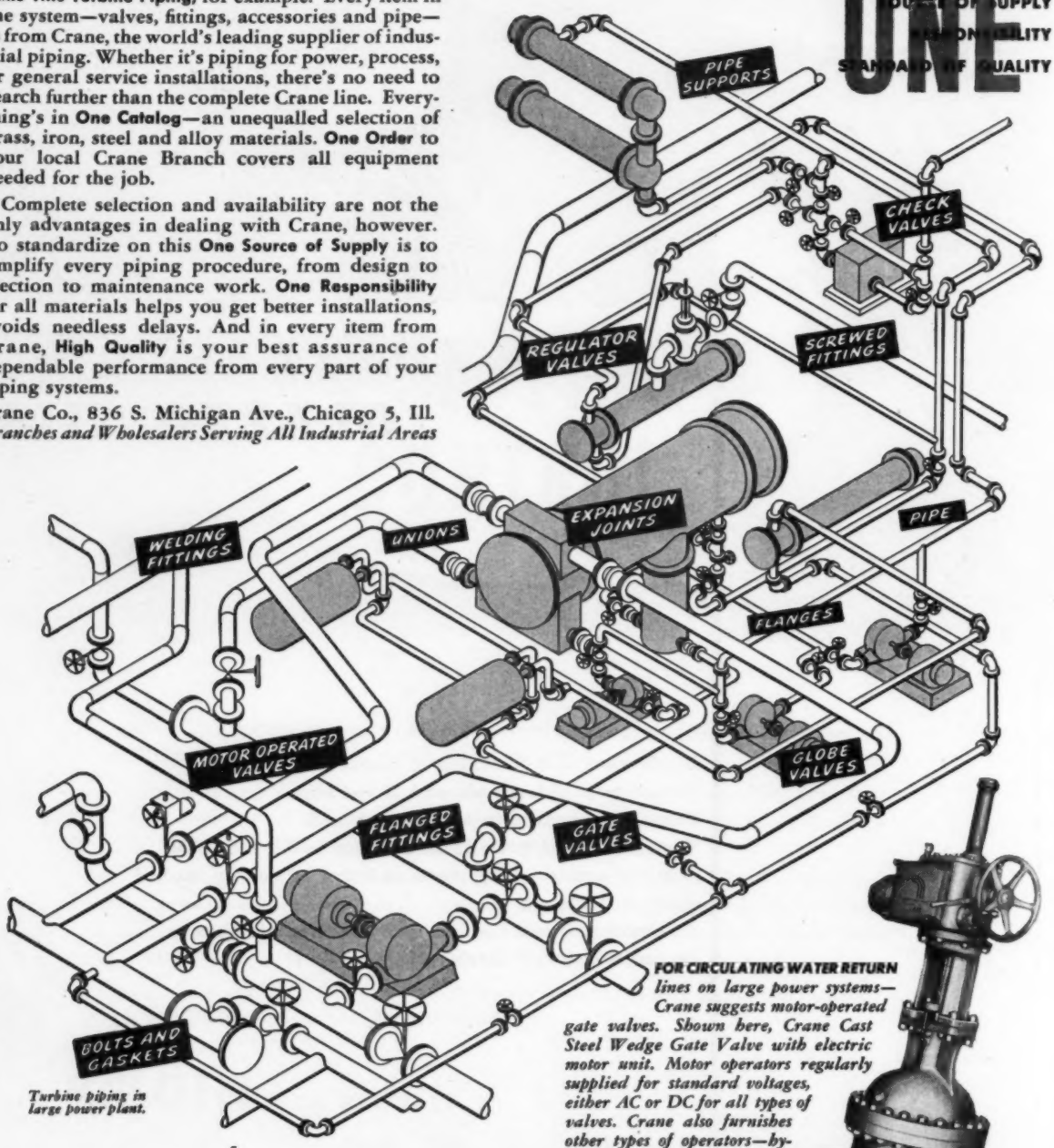


Turbine piping in large power plant.

FOR CIRCULATING WATER RETURN *lines on large power systems—Crane suggests motor-operated gate valves. Shown here, Crane Cast Steel Wedge Gate Valve with electric motor unit. Motor operators regularly supplied for standard voltages, either AC or DC for all types of valves. Crane also furnishes other types of operators—hydraulic, air, etc. See your Crane Catalog.*

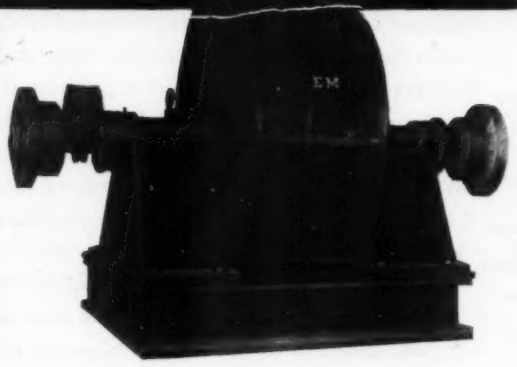
EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

● President Chas. E. Oakes, left, and Vice-President George M. Keenan examine model of 150,000 kw. Sunbury Station.



DETAILED SCALE MODEL illustrates planned construction of Sunbury Station of Pennsylvania Power & Light Company near Sunbury, Pa., where eight 635 hp., 840 rpm., E-M Magnetic Drives with Regutron Control are being installed to regulate induced draft fans.

At the Sunbury Plant of the Pennsylvania Power & Light Company, as in many other power plants, E-M Magnetic Drives with Regutron Control have been specified to provide precise, wide-range control of boiler draft fans, to save fuel and power, to prolong fan life and assure smooth, quiet fan operation.

Full information on E-M Magnetic Drives is available through your nearest E-M field engineer. Or write directly to us for Bulletin titled "Precision Speed Control for Boiler Draft Fans with Regutron-Controlled Magnetic Drive", written by our chief application engineer. Just ask for Publication 1078.

ELECTRIC MACHINERY MFG. COMPANY
Minneapolis 13, Minnesota

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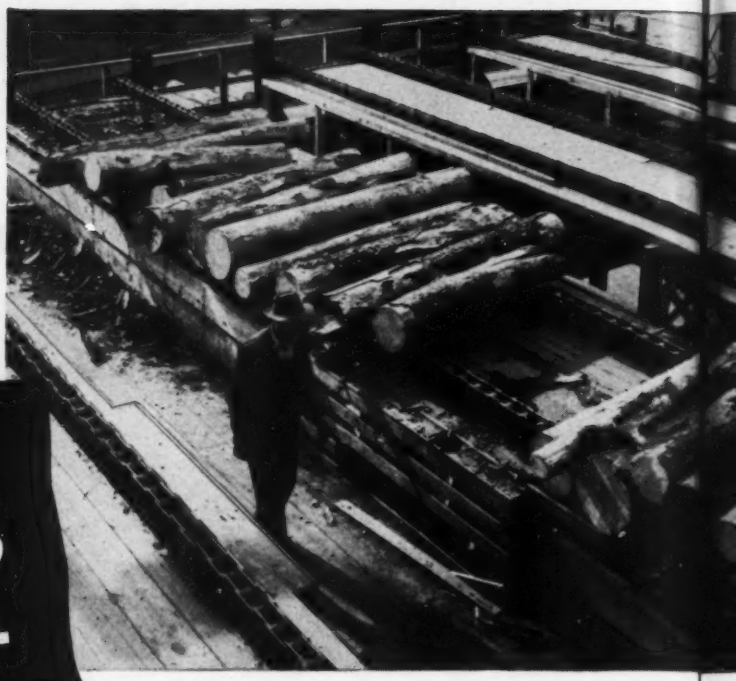
E-M

ADJUSTABLE-SPEED MAGNETIC DRIVES

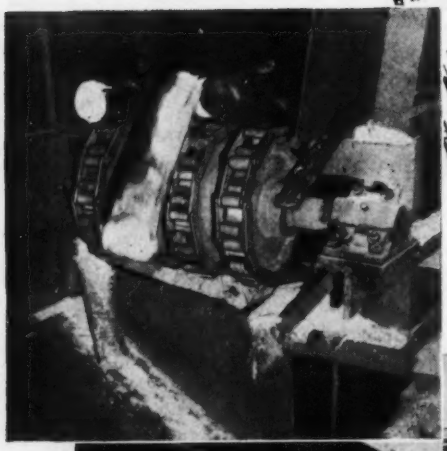


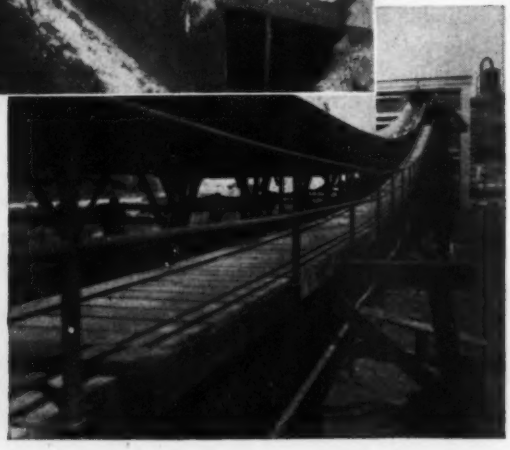
Life Line FOR ANY MILL

. . . Rex PULPMILL

THE wood handling system is truly the "life line" of a mill. That's why so many mills have standardized on the Rex Line of Standard Pulpmill Chains. No worries about premature chain failures to break the life line . . . hold up production . . . step up costs, with these husky chains on the job. They're designed and built to add life to any wood handling system . . . to keep going under loads and service conditions where ordinary chain would quickly fail.

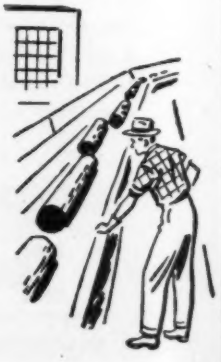
Whether they're steel or malleable, all Rex Chains are precision-built of the finest materials . . . assembled by the most modern manufactur-

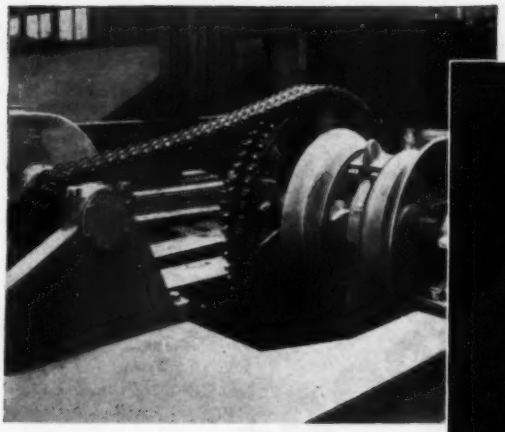




Feeding the enormous appetite of the barking drum, this Rex Combination Chain Conveyor keeps a steady supply of pulp logs moving from saws to drum.

Rex Chains do a double job in this application. The upper conveyor . . . Rex Combination Chain . . . carries the logs into the mill and the lower conveyor . . . Rex Drop Forged . . . handles the bark from barking drum to boiler.

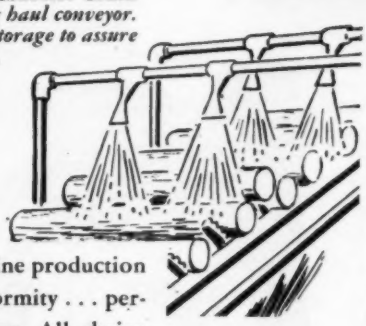




A double strand of Baldwin-Rex Roller Chain transmits the power for the log haul in this mill. The chain absorbs the shock loads, protecting the motor against unnecessary strains.

From splitter to barking drum, Rex Combination Chain, a big favorite in this pulp mill . . . furnishes the moving power.

Eight strands of Rex Steel Chabelco Chain make up this heavy-duty log haul conveyor. Conveyor also serves as log storage to assure a ready supply for the mill.



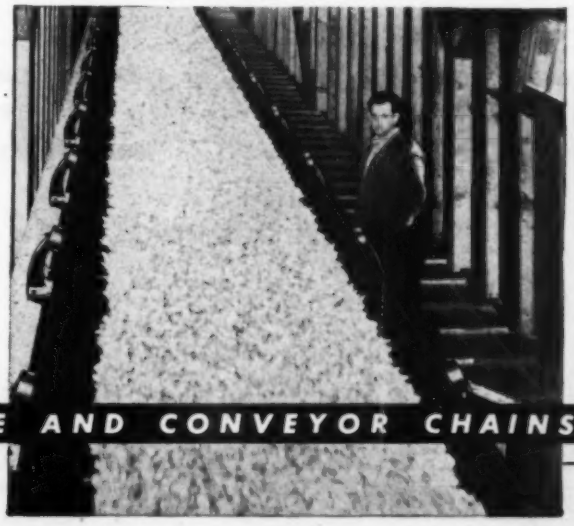
L CHAINS

ing methods. Modern assembly line production assures product quality and uniformity . . . permits closer inspection and testing. All chains are specifically designed for pulp mill service . . . to stand up under the particular job for which they are intended.

Right through your mill . . . from log haul to finished pulp, you'll find you can add life to the "life line" of the mill by standardizing on Standard Rex Pulpmill Chains. For complete information on how Rex Chains can help you, call your Rex Field Office or write to Chain Belt Company, 1714 W. Bruce St., Milwaukee 4, Wis.

Hogged fuel for the boilers is carried by Rex Drop Forged Chain equipped with wooden flights. Discharge is through the return run of the conveyor. Note the adjustable chutes.

Supported by easy-rolling Rex Belt Idlers, this belt conveyor . . . 60 inches wide . . . handles a big load of chips to the digesters.



CHAIN BELT REX COMPANY

DRIVE AND CONVEYOR CHAINS

TWO GREAT NAMES...DODGE-TIMKEN!

It was Dodge who took the famous Timken Bearing, mounted it, sealed it, housed it and delivered a pillow block of new high quality—fully assembled, ready to lock on the shaft and carry the power loads of industry with new efficiency.

Dodge develops *outstanding* power transmission products, as proved by the big success of Dodge-Timken Bearings on millions of industry's toughest jobs.

Dodge-Timken Bearings are supplied promptly from stock in four basic types and a wide range of sizes to meet an almost limitless variety of anti-friction problems.

Dodge also produces Ball Bearing Pillow Blocks which, with Dodge-Timken Bearings, comprise the famous "30,000 hour line." Write for complete bulletins.

DODGE MANUFACTURING CORPORATION
Mishawaka, Indiana

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER

He is your local Dodge Distributor—factory trained—qualified to suggest ways to improve your machine performance, increase production. Look for his name under "Power Transmission Equipment" in your classified phone book.

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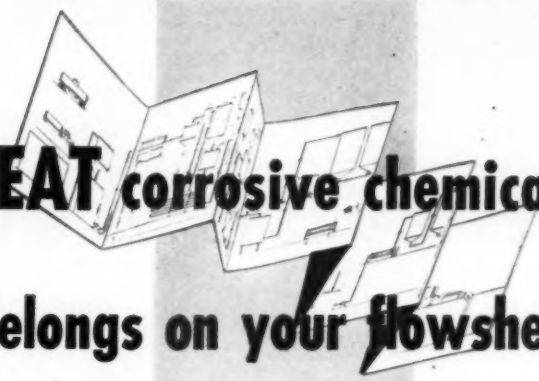
NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

IF you

PUMP, PIPE or HEAT corrosive chemicals

this EQUIPMENT belongs on your flowsheet



CORROSION-RESISTANT CONSTRUCTION

Durco equipment gives you: The proper alloy . . . the proper design . . . no coating or linings . . . corrosion resistance as thick as the metal itself.

MADE IN SPECIALIZED ALLOYS FOR SPECIFIC SERVICES

DURIRON—a high-silicon iron (14.5% Si.). For most commercial corrosives—particularly sulfuric, nitric and acetic acids at any strength or temperature. Bulletin 11.

DURICHLOR—a high-silicon molybdenum iron. For greater resistance to hydrochloric acid and its compounds, especially at higher temperatures and concentrations. Bulletin 50.

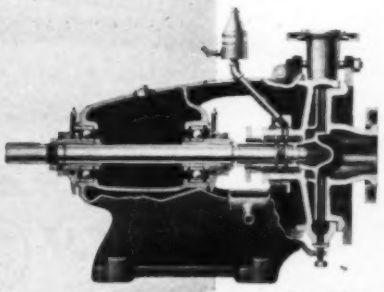
DURIMET 20—a high Ni-Cr-Mo-Cu low carbon stainless steel. For sulfuric and sulfurous acids, oleum, caustic, and other solutions. Bulletin 112.

CHLORIMET NO. 2 — nickel-molybdenum alloy; **CHLORIMET NO. 3**—nickel-molybdenum-chromium alloy. Chlorimet No. 2 for HCl in all concentrations and temperatures. Excellent for hot H_2SO_4 under reducing conditions and wet hydrogen chloride gas. Chlorimet No. 3 for most acids under oxidizing conditions, various salt solutions, hot sulfuric in concentrations of less than 35%. Bulletin 114.

OTHER ALLOYS— Durco D-10, Monel, Inconel, Pure Nickel, Ni-Resist and Nickel Cast-iron.

WHICH ALLOYS TO USE—*Write for Bulletin 100. It lists 155 corrosives and tells which Durco alloys handle each. For information on specific alloys and equipment, write for the bulletins mentioned above.*

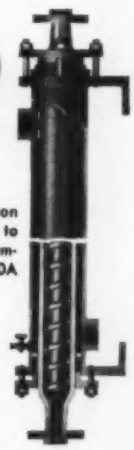
Durco Adv. 69-GM



Model 40 Durcopumps. Capacities up to 2,000 GPM; heads as high as 230 feet. Bulletin 815.

Durco Valves are made in a variety of popular types including Y and Angle Valves, Bul. 615, Plug Valves (Lubricated and Non-Lubricated) Bul. 617, 618 and 635, Diaphragm Valves, Bul. 623A.

Durco Split Flanged Pipe — Made in Duriron and Durichlor only. Standard sizes 1½" to 8", Bulletin 704.



Durco Heat Exchangers—Made of Duriron only. Can be set up in series or parallel to handle from 5 GPM to 100 GPM with temperature changes of 300°. Bulletin 1610A and 1611.

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

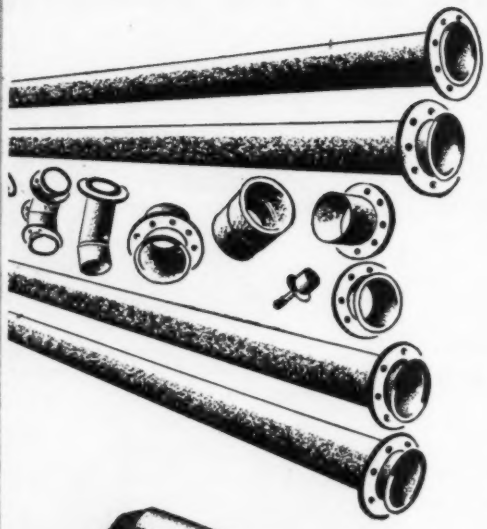
THE DURIRON CO., INC.

DAYTON 1, OHIO

Branch Offices in Principal Cities

For cost-wise mills . . .

STOCK LINES of MONEL



MORE than 15 years of trouble-free service! That is what one mill reports of MONEL* stock lines used for carrying alkaline bleached sulfite pulp. Scores of other mills report similar experiences with MONEL pulp-handling equipment.

What *special* properties of MONEL make such remarkable service records possible? There are many. It will pay you to consider them carefully!

MONEL is 100% rustproof, and highly resistant to corrosion and chemical attack. These features, alone, will put an end to your stock-line deterioration worries.

Add to the list, satin-smooth finish, strength equal to structural steel . . . *and you have a metal "made-to-order" for pulp, paper, and board mill uses.*

You'll find MONEL easy to work with, too. You can weld, braze, and solder it . . . perform any standard fabricating operation without special tools.

Important, too . . . because of MONEL's exceptional strength, you can use lighter sections for stock lines. Van Stone or other readily-connected joints will make it easy for you to remove or redesign your installations.

Your nearest INCO distributor stocks easily-workable "35" MONEL sheet. Or, if you prefer not to do your own fabricating, he will recommend competent concerns specializing in this work.

You'll find a list of distributors in: *"Lighter Weight, Longer Life, Lower Cost Stock Lines."* Send for your copy today.

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THE INTERNATIONAL NICKEL COMPANY, INC.
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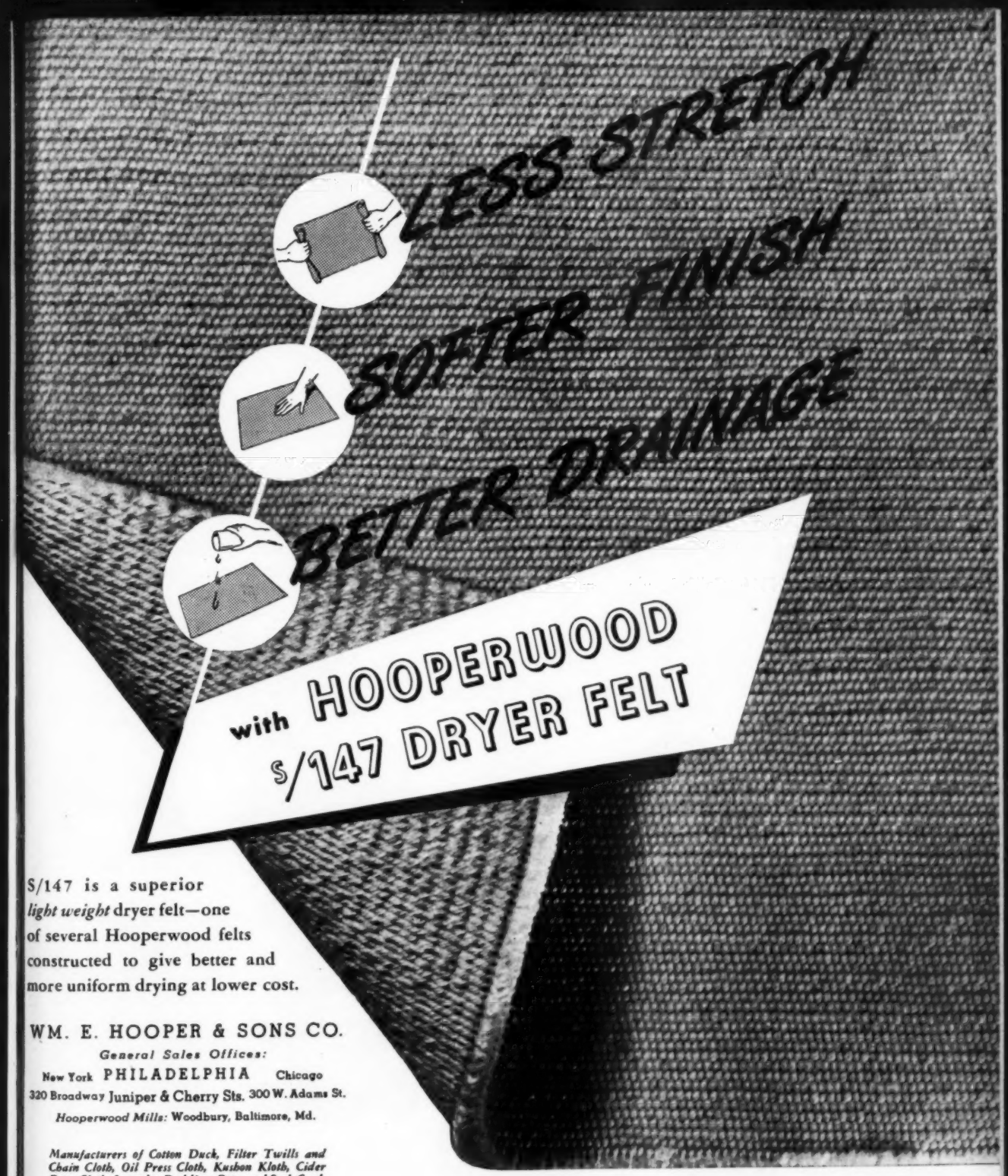
MONEL . . . *for Minimum Maintenance*



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Only POWELL makes a *complete* line of valves for the PAPER INDUSTRY

More than a hundred years ago Powell adopted a policy. This was to make valves *only* and to make *every kind* of valve that industry might require.

And through the years, strict adherence to this policy has built such a complete line of valves that today there's a Powell Valve for every known industrial flow control service. This includes Bronze and Iron Valves of all required types and designs; Cast Steel Valves of all types in pressure classes from 150 to 2500 pounds; and Corrosion Resistant Valves—including many special designs—made in the widest variety of metals and alloys ever used in making valves.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

Fig. 1893—Flanged end Gate Valve designed and developed especially for Paper Mill service. Body, bonnet and yoke are cast of 3% Nickel Iron; screwed-in seat rings are 18-8 SMo; solid wedge is made of Ni-resist.

Fig. 1561 — Class 150-pound Cast Steel Swing Check Valve.

Fig. 559 — 125-pound Iron Body Bronze Mounted Swing Check Valve with regrindable, renewable seat and disc. →

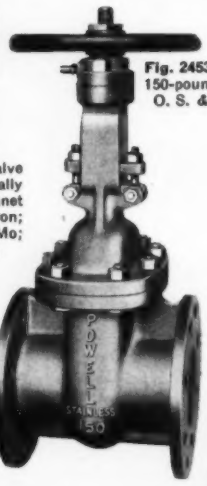

Fig. 2453-G — Standard 150-pound Stainless Steel O. S. & Y. Gate Valve.

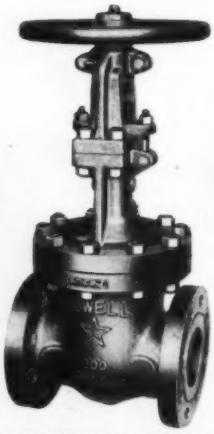

Fig. 3003—Class 300-pound Cast Steel O. S. & Y. Gate Valve.

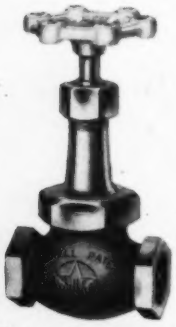

Fig. 1708 — 200-pound Bronze Globe Valve with renewable stainless steel seat and regrindable renewable "Powellium" nickel-bronze disc.

Fig. 375 — 200-pound Bronze Gate Valve with renewable "Powellium" nickel-bronze disc.

Fig. 1847—200-pound Stainless Steel Swing Check Valve. →

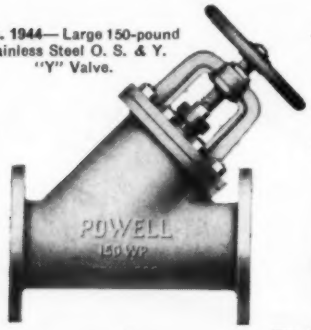

Fig. 1944— Large 150-pound Stainless Steel O. S. & Y. "Y" Valve.

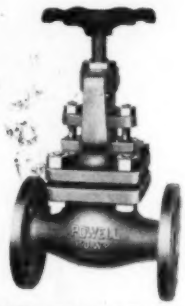

Fig. 1969—150-pound Stainless Steel O. S. & Y. Gate Valve.

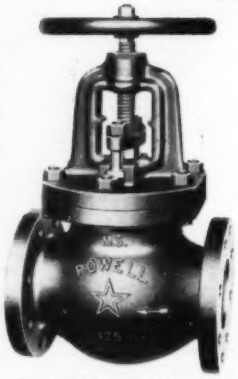

Fig. 241—Large 125-pound Iron Body Bronze Mounted O. S. & Y. Globe Valve.

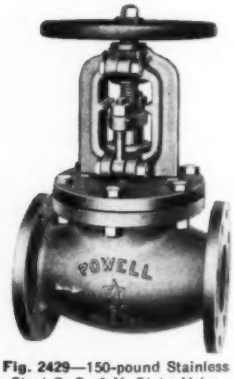

Fig. 2429—150-pound Stainless Steel O. S. & Y. Globe Valve.

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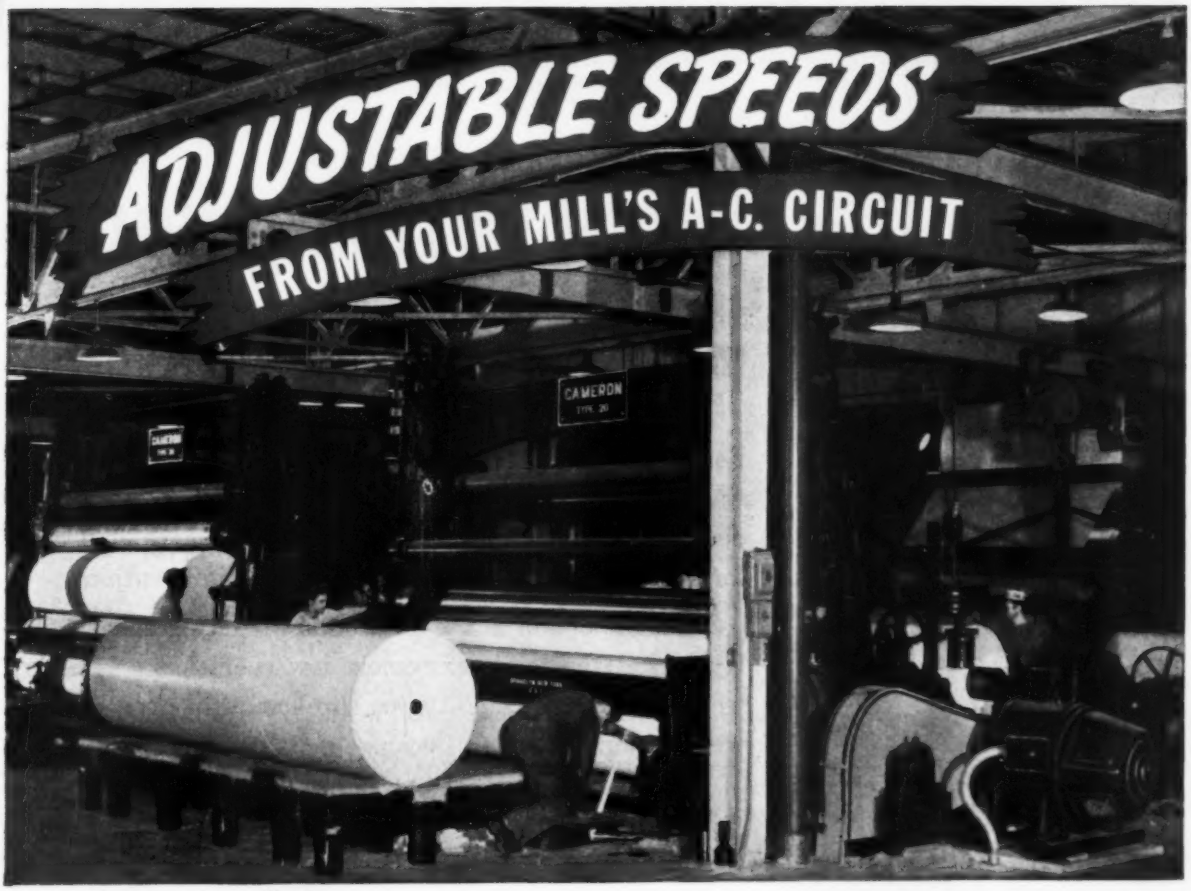

The precise speed for maximum efficiency in every step in the operation of slitters and rewinders is provided electrically by Reliance V★S Drive.

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Reliance V★S Drive has demonstrated its ability to provide faster processing at lower cost on a wide variety of equipment throughout the pulp and paper industry. Built right into a machine or installed with it, this *All-electric, Adjustable-speed Drive* will operate direct from your mill's A-c. circuit. And all V★S functions, including stepless speed changing, quick, smooth starting and stopping and maintenance of proper tension, can be controlled at the machine or from any remote location—manually or automatically. For a better picture of the job Reliance V★S can do for you, write today for *new* Bulletin 311.

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RELIANCE ELECTRIC AND ENGINEERING CO.

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The Ryertex forming board recently delivered to a southern kraft mill is 244" long, 21" wide and 1¾" thick. Slots, cut at an angle for easier drainage, give 1610 square in. of open area.

Giant Forming Board

made from *1* piece of Ryertex

Forming boards 244" long and 21" wide are a little out of the ordinary. But the reasons why a southern kraft producer specified Ryertex on the job shown here hold good for other paper mills, and other Ryertex applications.

Most important is the all around operating efficiency of Ryertex. Due to its extremely low coefficient of friction when water lubricated, wires slip smoothly over Ryertex with minimum wear. Because of its complete uniformity of structure, Ryertex has no hard and soft spots—will not splinter or wear unevenly like wooden boards. And the strength and toughness of Ryertex assures extra long life.

These same characteristics—low friction with water lubrication, toughness and uniformity, make Ryertex more efficient for paper mill bearings, too. On press and couch rolls, stretch and guide rolls, low friction means power savings. Water lubrication—cleaner operating conditions.

Ryertex bearings are job-proved in every step of paper making from grinders to calenders. Write today for complete information on the application in which you are interested.

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THE PAPER INDUSTRY
and PAPER WORLD
DECEMBER 1948

Paper---the Lean Years

VINCENT S. SMITH
(London, England)

▸▸▸ IN THE DAYS immediately following World War I, the opinion was freely expressed that paper would be in short supply for many years, but to practically everybody's astonishment, within eighteen months of November, 1918, the bottom fell out of the paper market, prices declined rapidly, and we moved into what was then politely termed a trade recession, a much nicer word than the old fashioned "slump," and this recession lasted for several years. Those were the days of unrestricted competition, no comprehensive planning, and every man for himself.

Today, when we are much wiser and are supporters of national and universal planning almost to a point of fanaticism, appearances are accumulating which unthinkingly might lead us to believe that history is about to repeat itself. In short we may unwittingly accept the opinion, occasionally expressed, that we have now reached the stage when more paper is being produced than is required. If anything could be more than erroneous, surely this is it.

Without being biased either in favor of the maker or the purchaser, let us examine such facts as are available, facts which can be checked easily by anyone who is so inclined.

To place ourselves on fairly safe ground and ignore the present situation for a moment, let us consider this country in prewar days when we consumed somewhere in the region of 3½ million tons of paper and board annually. Of this total just over 2½ million tons was produced by the home mills and the balance was imported. As far as we can recollect this high consumption was not then considered extraordinary or unusual but was taken for granted. We therefore see no reason to doubt that given similar conditions to those which operated in 1939, consumption could not be the same today or even greater, especially as the consumption of so many commodities is higher at present than in prewar.

As we are ready to accept the statement that we are consuming more cigarettes, milk, sugar, gas, electricity and a host of other things is there any valid reason to question our capability of consuming more paper? Yet we find a number of people who apparently experience difficulty in accepting the possibility that consumption could be even greater than it is at present.

If however we need proof of this possible extra consumption we have only to study the subject of newspaper sales. In prewar, we consumed for the purpose of newspaper production approximately 1,200,000 tons of newsprint annually and with this amount we were able to provide newspapers running up from 16 to 30 pages. Yet it has been estimated that with the present greatly increased circulations we should need two million tons of newsprint even if we limited every newspaper to 12 pages and no more. If this is the case with newspapers have we any reason to assume that a similar percentage increase would not be required for the weekly and monthly journals, trade journals and similar publications. Many of these journals have ceased to function since the war but the publishers are anxious for their re-issue along with a number of new ventures at present only in the embryo stage. Even among those still existing, their present size is only about a third of prewar. Again book publishing has almost unlimited millions to publish to replace blitzed classics and similar items, to meet home and export demands and to bring our publishing trade up to modern standards. Similarly the packaging of small and large commodities is at present far behind even prewar standards. The list could be extended but perhaps the examples cited are sufficient to confirm the tremendous usage of paper which awaits satisfaction.

To return for a moment to our prewar consumption of 3½ million tons. At present home production is only approximately 70 per cent of 1939 and importation about 40 per cent. Consequently against prewar we are roughly 780,000 tons down on home production and 600,000 tons on importation. In other words our present weekly consumption of paper and boards is nearly 27,000 tons down on prewar.

EDITOR'S NOTE: This article, which is being published currently in *London Paper Making and Paper Selling*, presents the British viewpoint of world paper trade conditions as interpreted by the author. The figures given have been compiled by Mr. Smith, who has been a contributor to this magazine over a period of years beginning before the War. His figures have not been verified by this publication.

With this figure in mind it is extremely difficult to understand how an idea can be prevalent that more is being produced than is required.

It would however appear that what is happening is that more paper and board is being produced than the Control, which responds to licensing by way of usage, will grant, which is a totally different aspect of the subject. In view of this position it is possible that the time has arrived when the quota grants to particular usages might be reviewed in the light of changing circumstances. On the other hand what may not be generally appreciated is that the Control, which since 1939 has been extremely careful to see that every consumer shared equally in the hardships and shortages due to war time conditions, has to be just as careful to see that all receive their equal share of any improvement which might operate. If the whole picture is looked at carefully and in an unbiassed manner there will probably be few who will not admit immediately that the actual basis of Control allocations has been extremely fair.

World Paper Trade Will Remain Inactive

Apart from the domestic aspect of paper consumption there is another and more alarming angle, not only at home but in practically every part of the world, which is occupying the minds of many paper trade leaders; that is the inability of the world paper trade, at present and for many years to come, to satisfy the continually increasing demands which it is receiving. This opens up a much larger subject but certainly one which has a bearing on home supplies and which every paper consumer should appreciate.

We do not think it is generally realized that the consumption of paper and paper boards all over the world has increased during the present century several hundred per cent over the consumption from the introduction of papermaking in the first century down to the year 1900. In this country alone it has risen by approximately 250 per cent, from a matter of a million tons a year to the prewar 3½ million tons. During the greater part of this period there have been continual warnings that our birth rate has been steadily declining but since 1939 this birth rate has broken all records. In short we have contributed our small quota towards the world's increased population of 150,000,000 over the past decade. Many of the little people who have been added to our numbers as a result of this increased population are now of school age and will soon be in their early teens and every one is capable of consuming paper in some form, as reading books, exercise books and countless other ways. In prewar our consumption per head of population was stated to have been 158 lb., consequently an increase as small as 1,400 in our population would require approximately another 100 tons of paper and board. If, on the other hand, our rate of consumption rises in proportion to the American rate, which over the last ten years has moved up by 41 per cent, then we should require nearer 150 tons even for this small increase in population. Apart from the above feature the purposes for which paper is used have increased considerably since the beginning of the present century.

The deduction from these figures and the possible increased demand is that even in this small island if we are once again granted paper and boards in abundance then not 3½ but more probably 4½ million tons will be needed.

Meanwhile, as stated, this country is by no means alone in this considerable increase in the consumption of paper. If we consider some of the countries of Europe we have many parallel examples. There is, of course, the continued loss in production due to destruction of paper and pulp mills as a result of bombing and other effects of the late war which was particularly severe in Finland and Germany or the dismantling of mills which happened in Holland.

Germany Faces Paper Famine

In Germany, where in prewar days the consumption per head of population was two-thirds that of Great Britain (102.9 lb.) up to three years after the end of the war less than 40 per cent of the paper and pulp producing concerns have been able to restart, at least in the British and American zones, and production in the Russian zone is stated to be even lower. In prewar production of pulp in Germany was 2,600,000 tons, placing this country fourth in the world's producers and paper represented nearly 4 per cent of its total exports. Today there is a practical famine in paper in this country, especially newsprint which is so urgently needed. Finland, with a prewar consumption of 71 lb and a paper export of 500,000 tons managed to reach nearly 1¾ million tons of pulp production and although conditions are improving their 1947 pulp production was under one million tons. In Norway where the prewar paper capacity production was in the region of 450, 500,000 tons this country has managed to get near their highest production figure of 440,000 tons but since 1939 home consumption has advanced from 100,000 tons to 150,000 tons despite the fact that this has been held in check for the benefit of export.

Production Up in Sweden

Among the more striking increases in production and consumption of paper is that of Sweden. Fifty years ago production in this country was only 86,000 tons but by last year this total had increased to 1,300,000 tons, meanwhile consumption in the fifty years has advanced from 53,000 tons in 1898 to 144,000 tons by 1923 and 530,000 tons in 1946. During last year home consumption was restricted to 455,000 tons to allow for greater exports.

Conditions in Russia are Only Speculative

Of the position in Russia we have little news but it was estimated that in 1940 the total production of paper and boards was 939,000 tons and during the first five-year postwar plan it is hoped to exceed prewar by 65 per cent. Some idea of the considerable growth in Russian paper consumption is disclosed by the fact that between 1913 and 1946 the number of newspapers published rose from 859 to 7,039 and their circulation from approximately 2¾ millions to over 29½ millions, concurrently the publishing of books has advanced from 86¾ to 463 millions. The over-all consumption of paper in this country was considered to be, in 1937, no more than 12.1 lb. With the Soviet Union's vast population and its present trend towards competing with the Western World it needs little imagination to appreciate the potential increase in paper usage which might eventuate in this country alone.

Production in Other European Countries Down

Even such a small country as Italy, in a paper making sense, the position today is far below that of 1939. Whereas production then was about 531,000 tons, in 1947 it was estimated that production would reach only 375,000 tons and it is expected that it will be some time before production returns to prewar.

As every country is tending to consume more and more paper it is interesting to note how far behind Great Britain was the consumption per head of population of some other European countries in 1937, according to the United States Department of Commerce Bureau of Census. Apart from those mentioned Sweden stood at 149.6 lb, Denmark 103.6, Austria 97.7, Belgium 84.8, France 36.4 and Italy 26.5.

Outside Europe Australia, for example, a country with a population less than that of London has always been a

fairly large importer of paper. Despite the fact that her own production at the beginning of the present century was extremely small but by 1929 it had reached over 34,000 tons and within fifteen years this production has been stepped up nearly 45 per cent to (in 1944) a total of 152,211 tons yet this country still finds it necessary to import a considerable amount of paper. In Brazil production has risen from 102,831 metric tons in 1937 to 139,613 metric tons in 1944 and a new paper and pulp mill is under erection designed to produce 40,000 tons of chemical pulp, 40,000 tons of newsprint and 18,000 tons of board annually. Yet reports from this country are that present imports are totally inadequate for current requirements and greater supplies are needed.

Considering India and Parkistan, where prewar consumption was only 1.1 lb per head of population, in these two countries, with their considerable population, the production of paper and board is only about 100,000 tons per year. It is obvious that granted peaceful progress and development along the lines at present propounded there is almost no limit to the amount of paper which will be required and we can but agree with the statement made at the jubilee celebrations of the Indian Paper Makers' Association last year that "with the gradual but sure growth of agriculture, education and industry attended by a substantial improvement in the income of the common man consumption of paper will soon increase." Admittedly certain projects are in hand for new mills and new machinery to increase production but as these take a considerable time to become effective it is doubtful if they will outstrip the increasing demand. In New Zealand where the population is relatively light it can boast a prewar consumption of 100 lb. and this consumption is steadily increasing.

Finally the story of paper and board consumption in the U.S.A. must surely rank as the most surprising and most interesting of all countries. At the beginning of the present century the U.S. had a population of 75 millions and at that time the consumption of paper was given as 2,167,000 tons. Apart from occasional years affected by current economic situation this consumption has progressed steadily. When we arrive at 1941 we find that the population has nearly doubled, reaching 133 millions, but paper consumption has increased something like 900 per cent to a total of 20 millions and still the demand remained unsatisfied. By 1946 another 7 millions had been added to the population and consumption of paper and board moved up to nearly 22½ million tons and it is estimated that by 1950 population will stand at 146 millions and paper demand touch the enormous figure of 27,387,500 tons. We can only wonder what will be the eventual limit.

Looking at the United States of America

Consideration of the U.S.A. naturally turns our thoughts to Canada. With this country, although heavy consumers of paper, the more important business is the exporting of paper and pulp and, of paper, newsprint is the dominating feature. Some idea of the world demand for this particular paper is disclosed by a chart recently published tracing newsprint production since 1915 when, in Canada, the total was 500,000 tons. By 1926 this became nearly 1,600,000 tons and in the next peak year, 1937, 3,500,000 tons. Following war time fluctuations it again moved forward to 4½ million tons in 1947. Already news confirms that last year's production is being beaten month by month. Oddly enough during these same years production of newsprint in the U.S.A. has moved down from 1,200,000 to 800,000 tons. Incidentally world production of newsprint in 1939 was estimated to be 7,732,000 tons but last year following war destruction of plant and reduced running in this and other countries, it was 649,000 tons below this figure. The variation given in Sir Walter Layton's recent report appeared to be even greater with prewar at 8,159,000 tons against 6,803,000 tons in 1946. Whatever the difference it is not sufficient to account for the prewar world "abundance" and today's "famine" but most certainly points to much higher consumption by those countries which can afford to purchase newsprint.

Reviewing the above which is almost a brief glance at the constantly increasing paper consumption and has not even mentioned China, Japan, South Africa, several European countries including the Baltic States it is difficult to reach any other conclusion than that there is no apparent limit to World Paper Trade expansion.

Industry Under Free Enterprise*

▶▶▶ WE WOULD come much closer to having the kind of government you and I want if more business men, instead of sitting in their swivel chairs and damning the politicians, would offer their own services to get in there and do something personally about achieving good government. There is plenty of room for good men in politics at all levels, from precinct committeeman to the Presidency. . . .

In what respect is industrial management challenged by this growing conflict? We are challenged to increase production at an unprecedented rate, to sell our products at low prices, to pay high wages and to promote harmony within our own ranks as well as to assist in promoting community and national welfare. In short, we are challenged to make free competitive enterprise do a better job of satisfying man's wants than ever before. To meet the challenge requires leadership perhaps beyond anything industrial management has previously displayed, and yet I believe that American industrial leaders, as represented by the National Association of Foremen, are equal to the task.

Whatever may be the shortcomings of our system of government and of our economy it is indisputably true that we have provided the richest life that has ever come to any civilization. American industry has contributed immeasurably to this accomplishment by producing more and better goods, at lower cost in terms of human effort, and distributing them more equitably among all our people than in any other land in the history of this globe.

The average American worker can earn a quart of milk in ten minutes; in Russia it takes an hour and eighteen minutes. The American worker earns a loaf of bread in seven minutes against and hour and ten minutes in Russia. Our average worker can earn a double-breasted wool suit in 28 hours. In Russia, it takes 580 hours. Even during the worst days of the war, when everything was scarce and many things were rationed, we were better off than people in other nations during their periods of greatest prosperity.

And what made all this possible? American industry operating under the free enterprise system.

The time we spend fighting with labor is wasted time in the sense that no useful product results. It takes a lot out of us, and it must also take a lot out of them. How wonderful it would be if we could just direct all those energies and all that time into useful and productive channels.

(*) Excerpted from address given by Fred Maytag II, president of The Maytag Company, Newton, Iowa, at the Silver Jubilee Convention of the National Association of Foremen, held September 24, 1948.

Temperature Measuring Systems

E. A. MURPHY
Instrumentation Engineer
The Brown Instrument Company

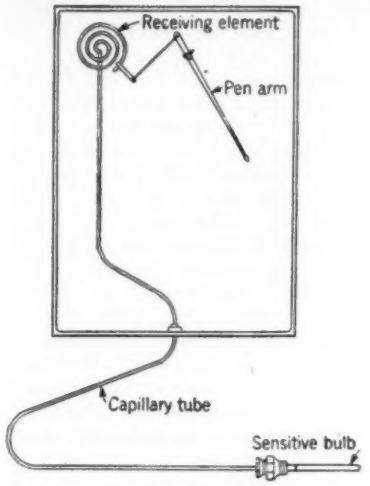

Fig. 1—Pressure type thermal system showing temperature sensitive bulb, capillary tubing, spiral actuating element, and recording pen

▶▶▶ TEMPERATURES that must be measured and controlled in the manufacture of pulp and paper ranges from approximately 80 Fahr. (in the acid plant) to over 1800 Fahr. (in the combustion chamber of a spray type sulphur burner), and are encountered under many and varied process conditions.

There are many applications where any one of the systems described, with the exception of the radiation pyrometer, will provide adequate measurement or control. In such instances, it is necessary to draw up a sort of trial balance sheet, weighing initial cost against such other factors as: (1) maintenance cost; (2) assurance of continuous operation; (3) desirability of remote location of recorder or controller; (4) desirability of multiple temperature measurement; and (5) ease of adapting the equipment to centralized control.

The following discussion should provide a basis for selecting that instrument which will best fill the requirements of a given temperature measurement or control problem.

Disregarding several rather highly specialized measuring systems, not normally encountered in this industry, temperature measuring instruments can be divided into the following classes: (1) pressure-type thermometers, in which the temperature sensitive element and the spiral actuating element are integral parts of a complete thermal system and cannot be separated in the field; and (2) electrical temperature measuring systems, in which the temperature sensitive elements are entirely separate from the measuring system and connected to it by electrical conductors. The latter class can be further subdivided into: (a) resistance thermometers; (b) millivoltmeter pyrometers; (c) mechanical potentiometer pyrometers; (d) electronic potentiometer pyrometers; and (e) radiation pyrometers. All of these systems are available with instruments of the indicating, recording, or controlling type.

Pressure Type Thermometers

At least ninety-five per cent of the temperature measuring applications in a mill fall within the range of the pressure-type thermometer. In fact, the majority of these applications are handled by this type of instrument. Various manufacturers establish different maximum measurable temperatures for these instruments but in general it is safe to assume 1000 Fahr. as the upper limit.

The measuring system is really a refinement of the familiar glass stem thermometer. In the latter device, the temperature sensitive bulb and the glass capillary comprise a sealed system containing the actuating medium which, by its vertical position in the glass stem, indicates the temperature to which the bulb is exposed.

In the pressure-type thermometer, the glass bulb is replaced by a metal one which is connected to a length of capillary tubing. The other end of this tubing is connected to a metal spiral, and the whole assembly—bulb, capillary tubing, and spiral actuating element as shown in Figure 1, all filled with fluid under pressure, make up the sealed thermal system. Since the entire system is under pressure, these instruments are often known as "pressure type thermometers." A change in the temperature of the bulb causes a corresponding change in the pressure set up by the actuating medium within the sealed thermal system. This pressure change produces a winding or unwinding movement of the actuating spiral, thereby moving the recording pen on the chart. When the instrument functions as a controller, control action is initiated by pen movement.

Chief advantage of a pressure-type thermometer is its relatively low initial cost. In order to realize this saving in initial cost, however, it is important that the instrument be properly applied. The recorder or controller should be mounted near the point of measurement, since the cost of a pressure-type thermometer increases as the distance between the bulb and the instrument increases. This increase is due to the cost of the armored capillary tubing.

When not employed as a controller, a thermometer can be supplied with a hand-wound chart drive, making it possible to locate the instrument away from any source of electric power.

Maintenance is a significant factor. If the recorder or controller is located an appreciable distance from the point of measurement, it becomes difficult to protect the capillary tubing from damage. Should this tubing be damaged, on-the-spot repair is impossible since the thermal system quickly loses all or part of its fill. The entire thermal system must be removed and replaced and the damaged system returned to the manufacturer for repair.

Increasing popularity of remotely located centralized control panels or cubicles often require that the indicator or recorder be located an appreciable distance from the point of measurement. This necessitates long runs of capillary tubing which not only increase both the initial cost and possibility of damage, but can also reduce the sensitivity and speed of response of a pressure-type thermometer. Use of a pneumatic transmitter at the point of measurement and a recording receiver on the central panel or cubicle, eliminates the disadvantages traceable to excessive lengths of capillary tubing, but

accomplishes this result at an increase in initial cost.

Many mill processes call for multiple temperature measurement. In the acid plant or the evaporator room, for example, it is highly desirable to obtain on one chart continuous records of a number of closely related temperatures. The recording thermometer is limited in its ability to record a number of temperatures on a single chart. Since each temperature measured requires a complete thermal system, the physical size of the instrument case limits the number of pens and actuating spirals that can be employed in one instrument. Two- and three-pen recording thermometers are quite common.

An attempt to list all of the possible applications for pressure-type thermometers would include practically every mill process where temperature is an important factor. With the exception of those few applications, such as rotary lime kilns and sulphur burner combustion chambers, where temperatures are above the maximum range of the pressure-type thermometer, this instrument can be, and is, employed on every temperature measuring application where a careful consideration of its advantages and limitations renders its use economically feasible.

Electrical Temperature Measuring Instrument

Since, with the exception of minor changes in their electrical circuits, most of the instruments employed for measuring temperature electrically can be

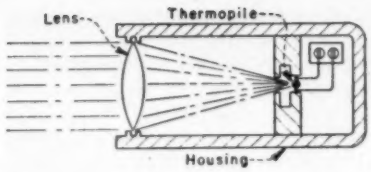

Fig. 2—Primary measuring element of radiation pyrometer illustrating manner in which lens focuses radiant energy upon thermopile

supplied with any one of several types of primary measuring elements, it is helpful to compare these elements first, and later to discuss the instruments. It then will be possible to select that combination of primary measuring element and indicating, recording or controlling instrument which will provide best service on a specific application.

Resistance Thermometer Bulbs

The resistance thermometer bulb is a temperature sensitive element consisting of a small wire coil which changes its resistance as its temperature changes. This change in resistance is measured by a millivoltmeter or potentiometer calibrated in temperature units.

Resistance thermometer bulbs posses all of the advantages of thermocouples, plus a high degree of accuracy over relatively narrow temperature spans. They are more expensive and more susceptible to mechanical damage than thermocouples. The conventional bulb is limited to temperatures below 600 Fahr. but special bulbs can be obtained for temperatures up to 1000 Fahr. They are sometimes used in digesters and evaporators.

Thermocouples

When exposed to a temperature change, the thermocouple produces a measurable electrical effect. It consists of two pieces of dissimilar wire welded together at one end. The welded tip is called the "hot junction." The small voltage generated by a thermocouple depends on the temperature difference between the "hot junction" and the unwelded end known as the "cold junction." By use of suitable extension wire, this "cold junction" is extended to the measuring instrument.

Thermocouples are made in a variety of sizes and from many combinations of metals which permit measurement of temperatures ranging from 100 to above 2000 Fahr. It is thus possible to obtain a thermocouple of a size and type appropriate for any application. Least expensive of the primary measuring elements employed with electrical temperature measuring system, thermocouples are readily tested and repaired. Because of the small mass of thermocouples and the fact that on many applications, it is possible to use bare, unprotected couples, a high degree of sensitivity can be obtained.

In a discussion of the application of thermocouples to pulp and paper mill temperature measuring problems, it is difficult to conceive any actual limitations. As a matter of fact, it is only in the higher temperature ranges (for example those encountered in the com-

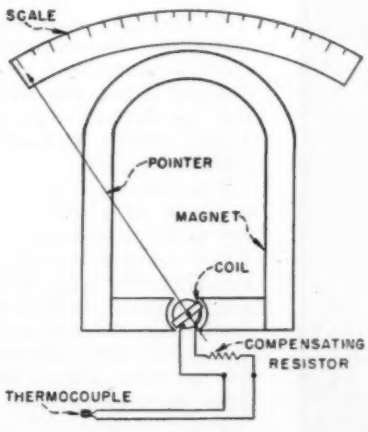

Fig. 3—Typical millivoltmeter pyrometer

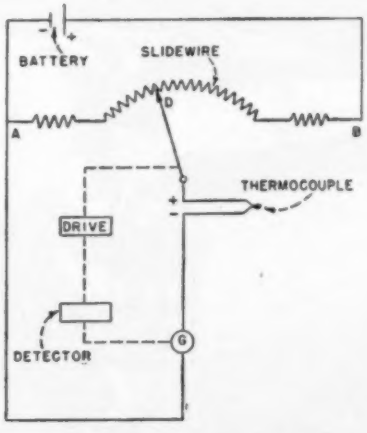

Fig. 4—Basic mechanical potentiometer circuit

bustion chamber of sulphur burners) that the thermocouple loses ground as a primary measuring element. Here, the high temperature combined with the corrosive action of the gas can bring about a relatively rapid deterioration of the protecting tube and the thermocouple, requiring periodic replacement of both.

Although emphasis is sometimes placed on the increased accuracy of the resistance thermometer bulb over the thermocouple on narrow temperature spans—the factor primarily responsible for the widespread use of the former on evaporators—there are in operation thermocouple actuated temperature measuring systems which are giving highly satisfactory service on this application.

A list of typical thermocouple applications would include practically every mill process where temperature is an important variable. In almost every case, the decision as to whether or not a thermocouple should be used will depend largely upon consideration of all the arguments for and against the employment of electrical temperature measurement.

Radiation Units

Designed originally for the measurement of extremely high temperatures, radiation sensing elements find several applications throughout the mill. Briefly, this primary device (Figure 2) consists of a thermopile (a number of very small thermocouples connected in series) and a lens for focusing radiant energy upon the thermopile.

Operation of a radiation pyrometer is based on the fact that the radiant energy emitted by a hot body varies as the fourth power of its temperature. Since this radiant energy, which varies with temperature, is focused on the thermopile, there will be a corresponding change in the emf transmitted from the primary element to the indicating or recording instrument.

With a radiation detecting element it is possible to measure high temperatures in corrosive atmospheres where the life of a thermocouple would be prohibitively short. Since the element is sighted on the object whose temperature is being measured and is not in physical contact with it, temperatures of moving objetcs such as lime kilns can be measured. This factor contributes toward long life and low maintenance.

Developments in the field of radiation pyrometry now make it possible to utilize this method of measurement in the relatively low temperature range of 125 to 350 Fahr. A radiation pyrometer is an expensive primary measuring element. However, this device was designed for applications where other measuring elements can not be employed to advantage.

Obviously, any concentration of dust or smoke coming between the radiation detector and the object upon which it is sighted, temporarily will upset the instrument reading. The unit will perform consistently only when sighted on an object whose emissivity (ability to emit radiation) is constant. The emissivity of some materials such as polished aluminum varies greatly with temperatures, a condition which will cause an instrument basing its operation on radiation measurement to give erratic temperature indications.

Radiation pyrometers of the high temperature type are practical for temperature measurement of lime kilns and sulphur burner combustion chambers. The recently developed low temperature radiation unit might well be applicable to the temperature measurement of drying cylinders and continuous paper sheets.

Electrical Indicating and Recording Instruments

As mentioned previously, several types of electrical instruments are available as indicators or recorders and with pneumatic or electric control. All of these instruments can be supplied with resistance thermometer bulbs, thermocouples, or radiation units as the primary measuring element.

Millivoltmeters

Least expensive of the electrical temperature measuring instruments, the millivoltmeter (Figure 3) is known as a deflectional type instrument and employs a galvanometer calibrated in accord with the electrical characteristics of the primary measuring element. This galvanometer consists of a small coil suspended in a magnetic field. The voltage generated by the primary measuring device is passed through this coil setting up a torque which is opposed by delicate hair springs. Since the indicating pointer is fixed to the suspended coil, the instrument is calibrated to provide a coil rotation proportional to the voltage generated by the primary measuring device.

The chief advantage of the millivoltmeter pyrometer is its relatively low initial cost when compared with other electrical temperature measuring instruments. Where indication of temperature is desired, it can operate in a location remote from any source of electric power.

The main objections to millivoltmeters are: (1) lack of sensitivity to very small temperature changes over narrow temperature spans; (2) susceptibility to damage from vibration and mechanical shock; and (3) effect of circuit resistance upon the operation of the instrument, a factor which limits the allowable distance between the point of measurement and the indicator or recorder.

The millivoltmeter pyrometer is not widely used in paper mills. In general, however, it can be employed on many of the applications handled by indicating thermometers or potentiometer pyrometers, providing it is not ruled

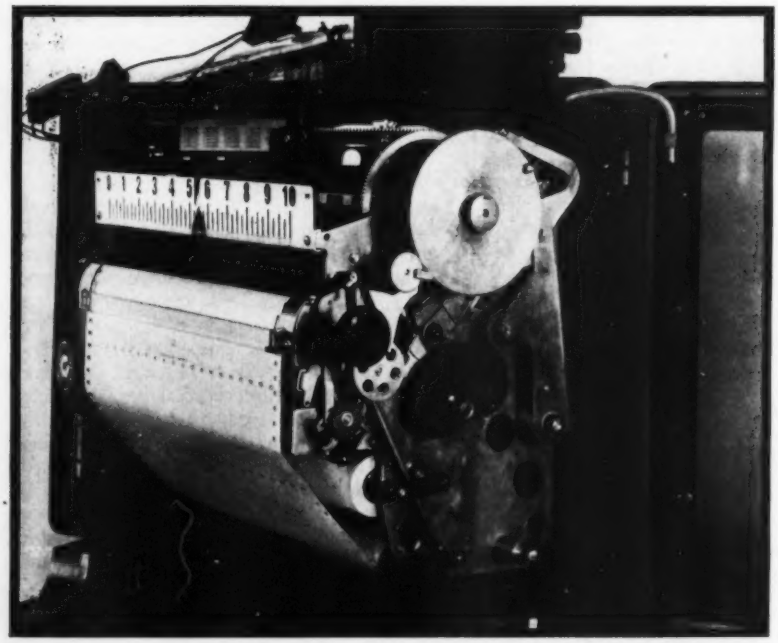

Fig. 5—Mechanically balanced potentiometer showing large number of moving parts

out by some of the limitations listed above.

Potentiometers

A potentiometer is known as "null balance" type instrument as opposed to a millivoltmeter which is a "deflectional" type. For purposes of comparison, a millivoltmeter can be likened to the familiar penny weighing scale, where the weight of the person on the platform is opposed by an internal spring mechanism; a potentiometer, on the other hand, functions in the manner of a precision balance in which the unknown weight is placed in one pan, and known weights are added to the other pan until the indicating pointer rests on zero.

It can be seen from the basic potentiometer circuit (shown in Figure 4) that the voltage developed by the primary measuring element, in this case a thermocouple, is balanced against a known voltage from a battery within the instrument. A change in temperature at the "hot junction" of the thermocouple causes a change in the emf applied to slidewire D, thereby unbalancing the electrical bridge. The direction and amount of this unbalance is indicated by a galvanometer G (in the case of a mechanically balanced potentiometer). A detecting mechanism determines the position of the galvanometer pointer and through a mechanical linkage repositions the contactor on slidewire D until the thermocouple voltage and the known voltage from the battery are equal. The potentiometer is then in balance and indicates or records the measured temperature.

Mechanically Balanced Potentiometers

As its name implies, this instrument utilizes a mechanical means of detecting electrical bridge unbalance and repositioning the slidewire to obtain a balanced condition. The detecting and balancing mechanism operates periodically, i.e. checks the galvanometer pointer at regular intervals to determine whether a condition of unbalance exists. Since the instrument pen and pointer are both actuated by this balancing mechanism, it follows that indication and record of the measured temperature are periodic rather than continuous. A temperature change occurring at the "hot junction" of the thermocouple will not be reflected by the instrument until the next detecting and rebalancing cycle occurs. This results in a small measuring lag which is inherent in this type of instrument.

Because of the mechanism required to perform the balancing action, a mechanical potentiometer, as shown in Figure 5, employs a large number of moving parts, a factor of importance when considering maintenance.

When the instrument is located an appreciable distance from the primary measuring element (thermocouple, etc.), the external resistance introduced by the long length of extension wire may result in a decrease in sensitivity.

Mechanical potentiometers are employed as multiple indicators or recorders in digester houses, acid plants, power plants and bleach plants.

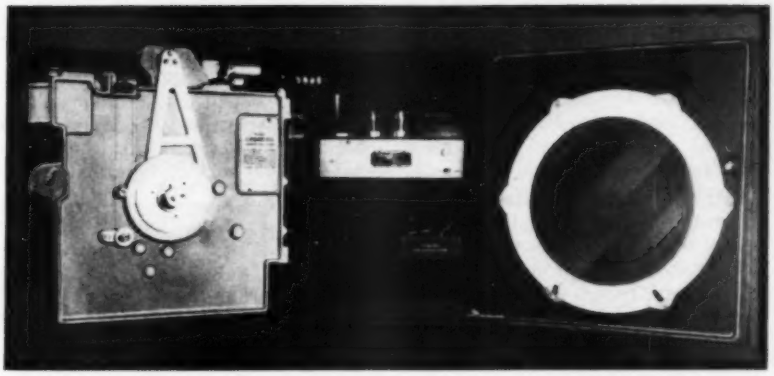

Fig. 6—Electronically balanced potentiometer showing small number of moving parts

Electronically Balanced Potentiometers

Most modern instrument in the field of temperature measurement, the electronic potentiometer combines the advantages of the mechanical potentiometer with additional advantages of its own. Like the mechanical instrument, the electronic potentiometer utilizes the potentiometer bridge measuring circuit.

In the latter instrument, however, a compact electronic unit performs continuously the same task that the multiplicity of moving parts in the mechanically balanced potentiometer perform periodically. Referring back to the basic mechanical potentiometer circuit in Figure 4, the galvanometer and mechanical detecting mechanism shown are replaced by a small unit which amplifies the unbalanced voltage electronically and uses the amplified unbalance to control the speed and direction of rotation of a balancing motor which in turn drives the pen and pointer. With the electronic instrument, temperature measurement is continuous rather than periodic, i.e., a change in temperature sensed by the primary measuring element causes immediate repositioning of the pen and pointer. The speed of response of such an instrument is limited only by the speed of response of the primary measuring element. Figure 6 illustrates the compactness of the electronically balanced potentiometer.

Neither the sensitivity nor the accuracy of this instrument is affected by external circuit resistance, a factor which makes it possible to locate the indicator or recorder any practical distance from the point of measurement. It is ideally suited for multiple indicating and recording. Similar to the mechanical potentiometer, the electronic unit with minor changes in internal wiring, is suitable for use with a variety of primary elements. This, of course, simplifies maintenance and reduces the stock of spare parts normally carried by the mill.

Initial cost is about the only factor that could be charged up as a limitation. Even this is relative, however, since in many cases it would be more than offset by the advantages gained. For example, initial cost would obviously be a serious disadvantage when weighing the merits of an electronic potentiometer against those of a recording thermometer for measuring white water temperature. Here, the use of an electronic instrument would hardly be justified. When considering the instrumentation for a sulphite acid plant, however, this disadvantage is offset by the ability of one electronic instrument to replace five or six recording thermometers.

Applications of electronic instruments throughout the mill are many and varied, including: digesters, dryers, sulphur burners, acid towers, lime kilns, multiple effect evaporators, and boiler plants.

Summary

There is no one type of temperature measuring system which can be said to be most economical or most practical for all mill processes. Although an electronic potentiometer can handle any mill process temperature satisfactorily, its high speed and extreme accuracy may be nullified by its initial cost on some applications. Conversely, although pressure-type thermometers, because of relatively low initial cost, might seem the answer to most of the

temperature measurement problems throughout the mill, the point may be reached where a combination of the characteristics inherent in each type of instrument will result in the long term cost (in some cases, even the initial cost) of a pressure-type thermometer being fairly high.

Each problem of temperature measurement or control should be considered separately and analyzed to determine the exact instrument requirements. Some factors to be considered are:

1) What degree of sensitivity and accuracy is called for?

2) What is the range of temperature involved?

3) Will the instrument be close to or remote from the point of measurement?

4) Should the instrument be an indicator, a recorder, or an indicating and/or recording controller?

5) Would it be advantageous to have records of several closely related temperatures on a single chart?

6) What type of control is needed —pneumatic or electric—on-off or proportioning?

7) If the instrument is to be a controller is the process batch or continuous, i.e. is continuous trouble-free operation of the control instrument a "must"?

8) Is use of a centralized control cubicle contemplated?

Experience proves that in the majority of cases the most satisfactory temperature measuring systems result from the joint planning of mill operators and experienced instrument engineers. Since all instrument manufacturers maintain staffs of engineers who are thoroughly familiar with the capabilities and limitations of the various types of temperature measuring instruments, mill operators should wherever possible, enlist their co-operation.

The subject of temperature measurement, if handled in detail, would entail the preparation of a lengthy treatise. In the preceding discussion there has been no attempt to include every possible argument for and against the various measuring systems, nor to list exceptions to the general statements made. If it has given a broad over-all picture of the advantages and limitations of the measuring systems discussed, the article has achieved its purpose.

Variable V-Belt Drives for Winders

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Allis-Chalmers Manufacturing Co.

▶▶▶ FOR EASILY and accurately making small changes in differential speed between rolls of calenders, winders, and similar equipment in paper mills, V-belt drives with motion-control sheaves are receiving more and more attention. With these efficient drives it is simple to make infinite speed changes within the range of the drive, at the scene or by remote control, without involving friction brakes or other heavy, complicated equipment.

The drive consists of a sheave on each roll shaft, connected by V-belts. At least one of the sheaves is of the motion-control type, the effective pitch diameter of which can be adjusted while the drive is in motion, to vary the speed ratio between it and the companion sheave. This adjustment can be made by a hand crank or handwheel connected to the sheave, or it may be made by a coupled pilot motor controlled by a remote pushbutton.

This equipment is easily adapted to the rolls of any make of machine without requiring any serious changes. If the roll shafts are too short, it may be necessary to use a flexible coupling with extended shaft to carry the sheaves. On some types of machines, a tightener pulley may be required. This may be purchased from the V-belt drive manufacturer, or it may be made locally. The plant's millwrights can easily install these drives and make the tightener attachment if one is needed.

Figure 3 shows a sketch of a typical installation of one motion-control sheave, one companion sheave, and a tightener. This arrangement with a screw type idler is preferred, since the possibility of jumping is eliminated. A weighted or spring-type idler is permissible if proper care is taken to keep the drive protected from possible pounding action of the idler pulley.

In some cases, two adjustable-pitch sheaves are used for the drive, one on each shaft, thus eliminating the tightener. Since both pulleys are adjustable, take-up for proper belt tension can be made with or without speed change, as desired.

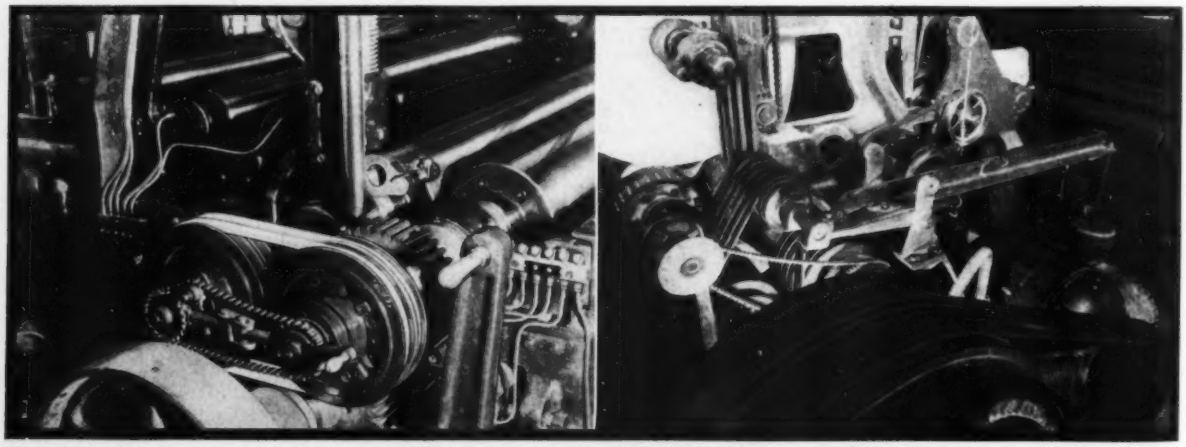

Fig. 1 (left)—Two motion-control, stub shaft type sheaves provide slight drag on one roll and maintain proper belt tension with required differential in roll speeds at all times . . . Fig. 2 (right)—In cases where an idler is required in the drive system, a mill often can make one in its own machine shop, as was done in the case of this idler on a winder drive in a Wisconsin mill

The motion control sheave is definitely preferable for these installations so that the drive speed can be changed while the machine is in operation. These sheaves can be purchased in the same sizes as the more common type which permit speed adjustment to be made only when the drive is at rest.

In planning these drives, the V-belt manufacturer's engineers should be furnished with information on roll speeds, shaft and roll diameters, distance between shaft centers, and length of shaft available on each roll for mounting the sheaves. The characteristics of the motor should also be given.

This type of drive is now in use on many different machines throughout all paper making districts, where it is a highly satisfactory solution to a number of perplexing drive problems. With small initial cost and low upkeep, it easily pays its way, while guaranteeing smooth-running variable-speed jobs.

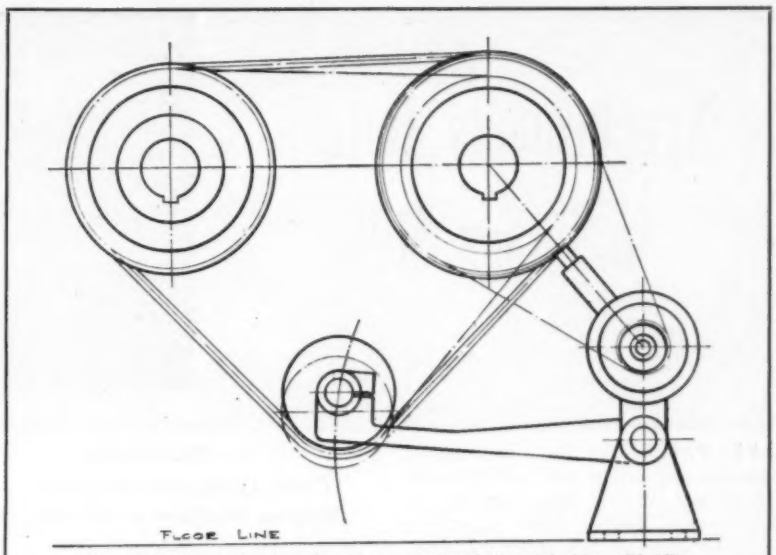

Fig. 3—Catalogue drawing of motion control variable pitch drive with idler

Improving Workers' Morale Through Attitude Testing

O. C. COOL, Director
The Labor Relations Institute

▸▸▸ CURIOSITY that is intelligent and purposeful breeds progress.

Some of the greatest scientific advances achieved by man have come as the result of curiosity concerning some puzzling or inexplicable event.

Today management is effecting sound progress in every branch of personnel relations, because it has become curious about what the workers think. Worker attitudes toward management are just as important in determining the state of productivity and morale in the paper industry as what management thinks about the workers.

Communications have become a two-way street. It is not merely necessary for the employer to try to implant a favorable cooperative state of mind among the workers, by the use of house organs, through bulletin boards and by word of mouth. It is vitally necessary to find out the worker's views towards every phase of his job. When the worker's attitude is favorable, his thoughts will be communicated to his fellower worker, and the task of winning loyal effort will be greatly simplified.

Despite the fact that attitude surveys have become recognized as valuable cost-cutting tools, too many employers in the paper industry have neglected them. This is not surprising, because a recent study showed that less than 7 per cent of the plants in this country have attempted an attitude survey or "opinion poll." Yet such surveys accomplish valuable results, not only in helping employers to avoid mistakes in employee relations, but in developing a dynamic, successful organization.

Today, when so much money is being spent on industrial relations activities, some employers are beginning to conduct surveys to find out whether those efforts are effective. As industry's break even point rises, and as competition becomes increasingly severe, it is necessary to analyze every cost. And the attitude survey is an accurate means of finding out whether the difficult-to-evaluate work in the field of worker relations, union relations and community relations is accomplishing results.

When a large Cleveland company recently conducted an attitude survey among its 2,300 employees in four plants and five cities, here are some of the subjects concerning which the workers were queried:

Cafeteria service: Are the prices too high? Is the food good? Is the lunch line too long?

The Plant Newspaper: Do the employees like it? Does it give them the material that they want?

Open Door Policy: Do the workers feel free to go to the boss and ask questions or register beefs?

Information about the Company: Does the employee get enough news about the company?

Working Conditions: Do they feel conditions have improved? Do they sense the desire of management to provide the best conditions possible?

Questions were also asked concerning supervision, job security, insurance benefits, attitude towards top managements, attitude of the foremen towards their jobs.

Among the facts revealed was that plant morale was high. But the assistant supervisors felt they were left out of things. The lunch line in one plant was too long. The employees felt that their suggestions were not receiving proper attention. There was a complete lack of understanding among foremen as well as workers concerning the incentive system, and as a result, there was considerable complaint against the administration of the wage system.

The merit increases, too, came in for kicks.

In short, the survey showed definite areas in which to effect improvements. And, management got busy. For example, to meet complaints about the incentive system, an effort was made to improve the training of low-earning employees, who were the source of almost all of the complaints about

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Synchronous Motors in Paper Mills

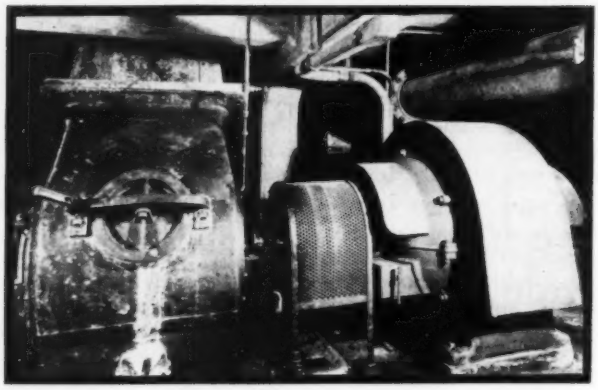

Figure 2

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Chief Application Engineer
Electric Machinery Mfg. Co.

▶▶▶ PAPERMAKING, in general, involves separating and cutting wood fibers and matting them together in continuous sheets. Fiber separation may be accomplished either mechanically or chemically. Removal of impurities, bleaching, and possible coloring also are essential parts of papermaking. Large amounts of power are utilized in these processes. The paper making industry provides for a wider variety of synchronous motor applications than any other industry. These uses include various types of grinders, chippers, refiners, fluid pumps, air compressors, vacuum pumps, motor generator sets, hogs, and boiler draft fans. Many of these are low or medium constant speed, normal torque applications. On these, the inherent advantages of high efficiency, power factor correction and direct connected drive of synchronous motors can be utilized to good advantage.

On certain drives, precisely-controllable, variable speeds are required. This applies particularly to fans and centrifugal pumps. Such operation can be obtained readily by the use of variable speed magnetic drives and constant speed motors. Synchronous motors are ideally suited to magnetic drive operation.

Grinders, jordans, refiners, air compressors, motor generator sets, and any application utilizing magnetic drives require only normal torques. Chippers, beaters, pulpers, hogs, vacuum pumps and fans require motors with higher than normal torque values. Typical recent installations with respect to motor horsepower, speeds, and torques are shown in Table 1.

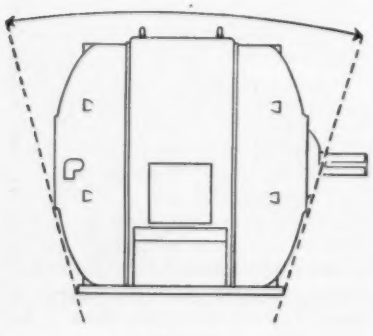


Figure 1

A dripproof motor (Figure 1) provides a 30-deg. arc of protection against falling liquids or particles. This type is recommended as a minimum standard, especially on medium and high speed units, instead of open-type construction. Figure 2 shows a 125-hp, 750-rpm, dripproof motor on a pulper.

A splashproof motor (Figure 3) provides a 200-deg. arc of protection against blown or splashing liquids. This is recommended for all locations where slopping liquids, hosing down of floors or draft borne moisture makes this protection desirable insurance against motor failure. Splashproof motors usually are considered satisfactory for outdoor installation. Presence of injurious fumes, salt spray, or drifting snow may not permit outdoor installation of splashproof motors.

Figures 4 and 5 illustrate (respectively) a 350-hp, 400-rpm jordan motor and a 250-hp, 450-rpm motor on a vacuum pump, both of splashproof construction.

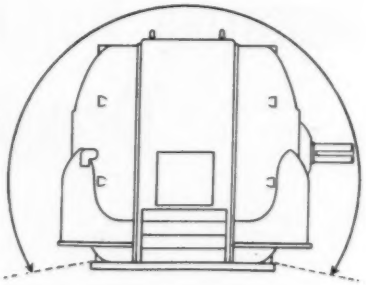


Figure 3

The motors in a large grinding room may dissipate several hundred kilowatts in losses continually. This necessitates some means for removal of the heated air. Figure 6 illustrates a row

TABLE 1

Load	*Starting Condition*	*Torque Range*			*Range*	
		Starting	*Pull In*	*Pull Out*	*HP*	*Speed*
Grinders	Unloaded	40-50	40-50	150	1000-4000	200-240
Chipper	Unloaded	60-100	60-100	250-350	150-1500	257-600
Beater	Loaded	125-140	110	150-175	75-250	360-514
Pulper	Loaded	160-180	110	150	150-250	600-720
Jordan	Unloaded	40	60	150	150-450	300-514
Refiner	Unloaded	40-100	40-100	150-200	150-400	450-1200
Fan Pump[1]	Loaded	60	100	150	250-350	360-450
Centrifugal Pump	Unloaded	40	60	150	75-250	900-1800
Air Compressor	Unloaded	40	40	150	100-250	277-327
Vacuum Pump[2]	Unloaded	40	60	150	200-400	300-400
Motor Gen. Set[2]	Unloaded	40	40	200	150-450	1200
Fan[1]	Unloaded	60	100	150	100-250	900-1200
Hogs	Unloaded	125	100	250	150-250	720-1200

(1) These loads are commonly driven through magnetic drives. In such cases low motor torques are satisfactory.
(2) These loads can be unloaded for starting, and the torques shown are satisfactory. However, it is often desirable for the motors to resynchronize after voltage dips. In such cases higher pull-in torques are required.

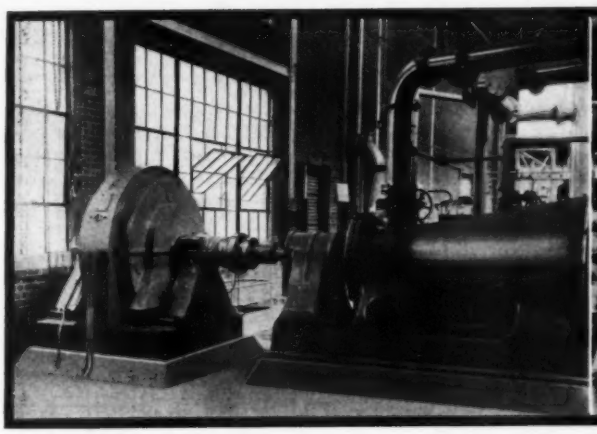


Figure 4

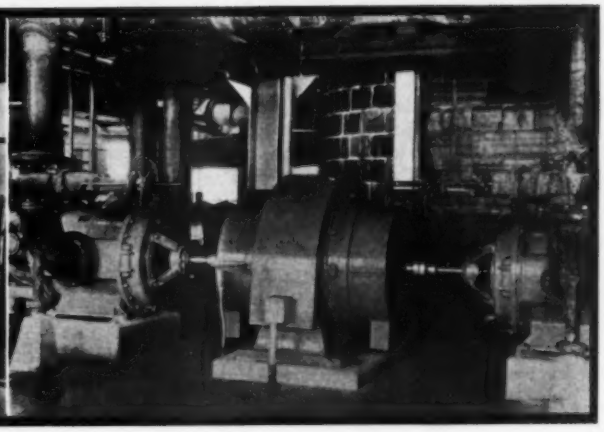


Figure 5

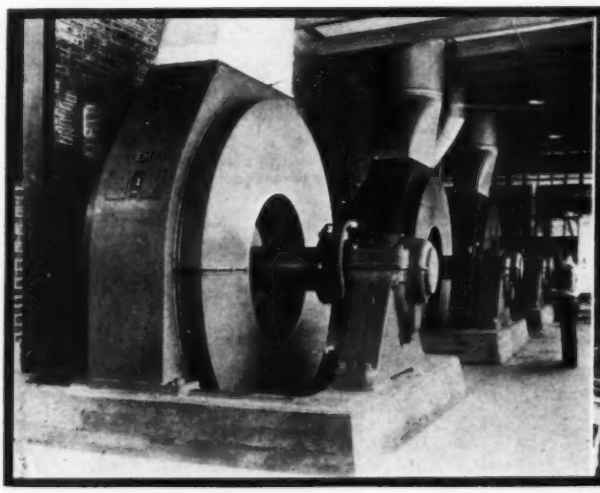


Figure 6

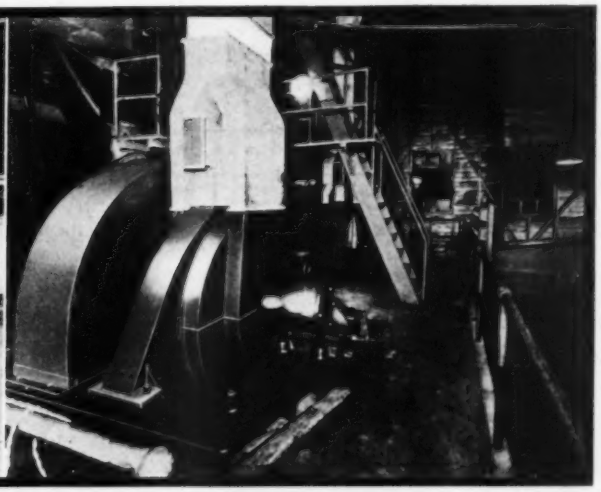


Figure 7

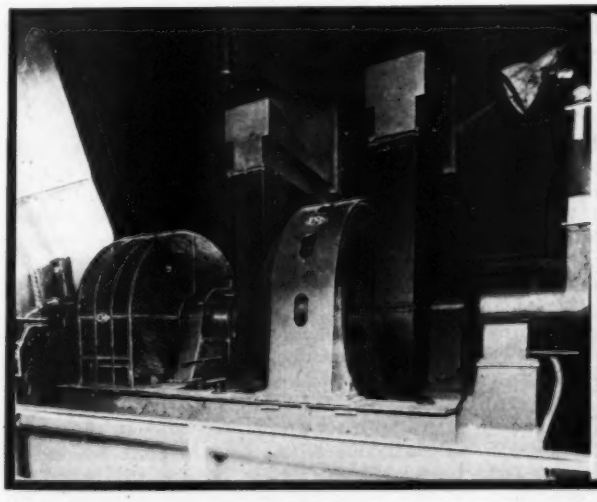


Figure 8

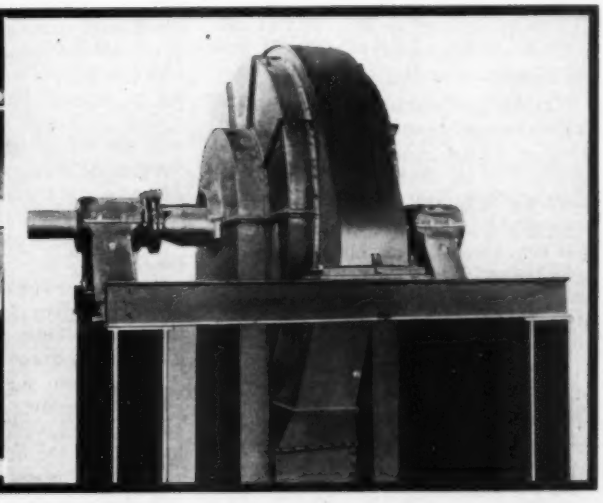


Figure 9

of 4,000-hp, 200-rpm, semienclosed, self-ventilated motors. Air is drawn in through the openings in the side enclosures and discharged outdoors through discharge ducts.

Cooling-air also may be drawn from outdoors and discharged in the room. Figures 7 and 8 show (respectively) a 250-hp, 257-rpm motor driving a chipper and a 700-hp, 720-rpm motor driving a boiler draft fan through a magnetic drive. These motors are arranged for this type of ventilation.

In some cases, totally-enclosed, self-ventilated motors with air-coolers and duct work may be preferred. Such a motor, rated 3,000 hp, 300 rpm, set up for test is shown in Figure 9. A diagrammatic representation of the cooling arrangement is shown in Figure 10.

Air compressor and motor generator set motors commonly are installed in locations where standard open-type motors are suitable. A general summary of recommended protective construction is shown in Table 2.

Other special types of construction such as totally-enclosed fan-cooled, explosion-proof, enclosed separately ventilated, and other arrangements are available for various industries. However, those types of construction usually are not required in pulp and paper mills. The tabulation in Table 2 shows the general requirements.

TABLE 2

Construction	*Application*
Open	Air compressors, vacuum pumps, fans, chippers, and grinders in clean, dry, well ventilated rooms
Dripproof	Any high speed motor; all low speed motors exposed to falling liquids or solids
Splashproof	Motors exposed to splashing liquids, or for outdoor installation
Self-ventilated, semienclosed, or enclosed with air cooler	Any installation where it is desirable to provide for removal of heated air from motor room

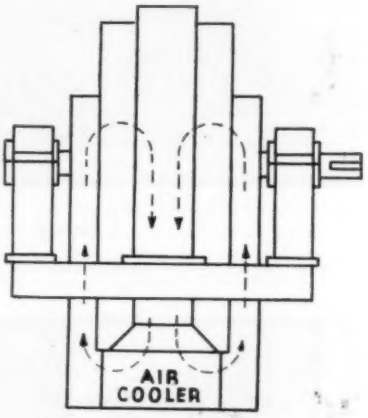


Figure 10

Improving Workers' Morale

(Continued from page 1347)

piecework. As a result, efficiency increased.

What this company accomplished is nothing unusual. Company after company is rolling back the "iron curtain" which prevents them from looking into their workers' minds.

But the problem is never the same for any two companies. Each survey must be tailor made to fit the needs of an individual organization. In one company, the grievance system needs more detailed analysis; in another case, supervision needs to be given special attention; in still another case, best results can be achieved by focusing on the incentive system.

The big problem for most employers is how to conduct the employee survey. Here is a brief summary of the steps that should be taken:

Step 1: Who should make the survey —qualified individuals in the personnel department or an outside agency which specializes in such work? In some cases, companies insist on doing the work themselves. Others hire attitude testing organizations.

Step 2: Prepare a detailed list of the subjects which are to be covered. These will vary from company to company.

Step 3: Decide which survey technique is best suited to your needs. There are two principal methods, the interview method or the written questionnaire, the latter more formal than the other.

Before making a decision on this question, the employer must consider comparative costs, reliability of results with each method, etc.

Step 4: Determine the "sample." It is not necessary to survey all the workers, unless the plant has less than 200 workers. The results will be just as accurate with 15 to 25 per cent of the workers, as when the entire group is surveyed.

The employer, however, must decide whether he wishes to select a "random sample," which means listing all employees alphabetically, and polling every "nth" name on the list; or whether he wants a "representative sample," which means polling employees according to their job classifications.

Step 5: Assure worker co-operation with the survey, by having foremen or the outside agency explain its purpose. This can also be done through a letter from the head of the company, or through a notice posted on the bulletin board.

Step 6: Use the results of the survey. If the employees make suggestions, and there is no follow through by the employer, resentment will be stimulated.

What I am suggesting is that the employer use the same scientific methods to unlock workers minds that have long been used to make sure that his advertising program is on the beam, and that his sales department is getting the best results. No company today would think of launching a costly advertising program without attempting to find out before long what the consumer thought of it, how he was reacting to it, and how it could be improved. This is done by various tests and surveys.

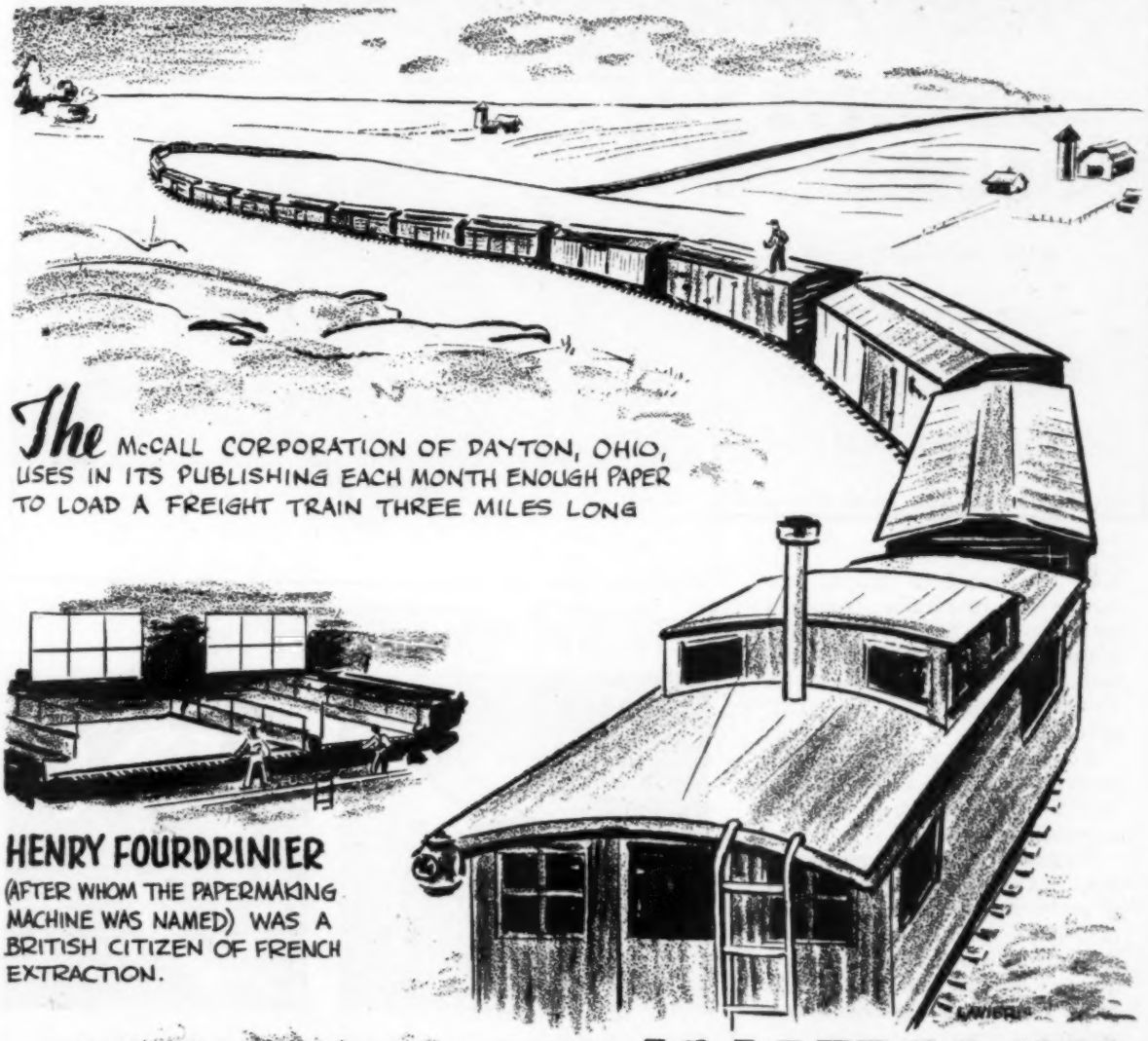
Today it is possible to test the attitude and morale of paper workers in the woodlands, in the paper mill, and in the office.

The company that must operate within a tight budget and win control over costs must know whether there are any weak spots in personnel policies or plant procedures. Through attitude surveys, good policies may be made even stronger and weak methods can be bolstered. Programs that are not pulling their own weight in the management boat can be discovered and eliminated, thus paring expenses.

With unions making demand after demand in the fringe benefit area, it is important for employers to discover what types of benefits the workers really want, so that he can make a settlement on terms that will provide the greatest satisfaction per dollar of cost.

One last word of advice: If the information on which the survey is based is obtained in confidence, it must be treated so by the employer. Subordinates who express opinions about their supervisors must be protected. In this way, surveys can be used time and again to sharpen managerial skills and to improve morale.

PAPER SKETCHES



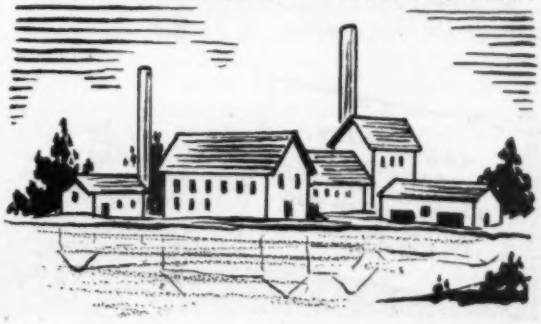
The McCALL CORPORATION OF DAYTON, OHIO, USES IN ITS PUBLISHING EACH MONTH ENOUGH PAPER TO LOAD A FREIGHT TRAIN THREE MILES LONG

HENRY FOURDRINIER

(AFTER WHOM THE PAPERMAKING MACHINE WAS NAMED) WAS A BRITISH CITIZEN OF FRENCH EXTRACTION.

AS LATE AS 1900

UP TO 5% OF THE PAPER PRODUCED BY MANY GERMAN PAPER COMPANIES WAS LOST IN THE WASTE WATERS THAT WERE DISCHARGED. THIS WASTE MATERIAL CONSISTED LARGELY OF FIBER AND FILLING MATERIALS

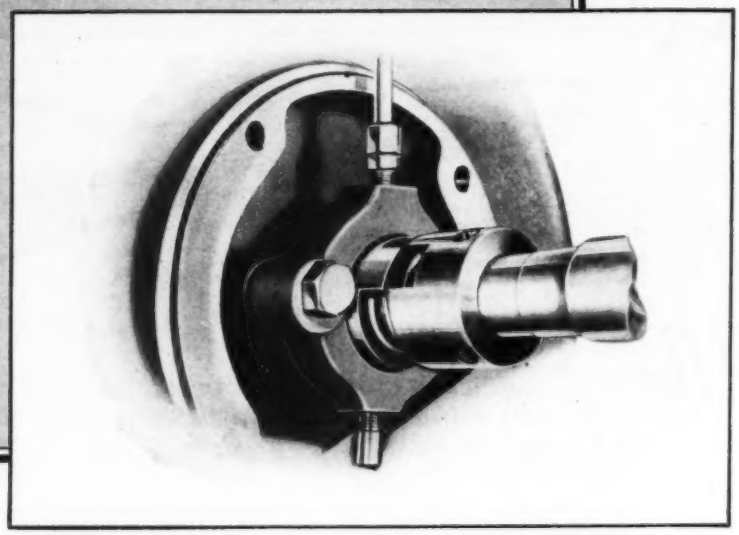


EARLY CHINESE PAPERMAKERS ARE SAID TO HAVE OBTAINED FIBERS FOR PAPERMAKING BY POUNDING PIECES OF BAMBOO THAT HAD BEEN SOAKED IN PITS OF LIME WATER.

When Packing Against

CORROSIVE LIQUIDS . . .

you can depend on *Worthington Worthite Pumps* equipped with *Type EA Mechanical Seals*



Worthington Type EA Mechanical Seal for Worthite Type CG Chemical Pumps. Three sizes of seals for 23 sizes of pumps.

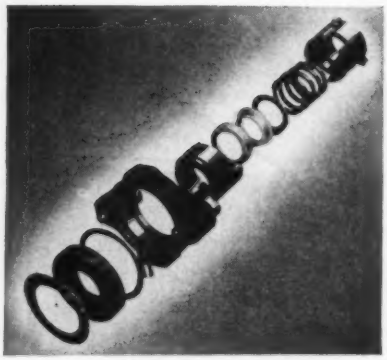
If you have been running into trouble with your stuffing boxes and packings, it's time to consider Worthington Type EA Mechanical Seals. They're especially designed for Type CG Worthite Pumps up to 1200 gpm capacity.

These seals have given outstanding performance in corrosive liquid service. The following distinctive features tell you why:

No stuffing box . . . no packing to replace. Outside assembly . . . easy to apply, simple to repair. No parts churning in acid. All parts made of corrosion resisting material. Pressure is adjustable without dismantling. Single coil Worthite spring. Tongue and groove drive.

Write for BULLETIN W-350-B-10.

For complete details about this Worthington contribution to better pumping of corrosive liquids and further proof that *there's more worth in Worthington* write for Bulletin W-350-B-10. *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*



Exploded view of Worthington Type EA Mechanical Seal shows simplicity of this tested solution to tough stuffing box problems.

CGH-1A Worthite pump equipped with Worthington Mechanical Seal in a Southern chemical plant.

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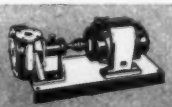
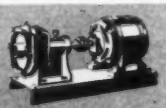
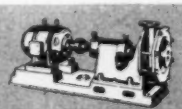


Types CG and CGL. Sizes ¾" to 10". Capacities to 5000 GPM; heads to 200 ft. Liquid ends of WORTHITE alloy.



Type CF. Sizes 1" to 4". Capacities to 1000 GPM; heads to 130 ft. Standard, all iron and all bronze.



Type CQ. Sizes 1½" to 3". Capacities to 600 GPM; heads to 130 ft. at 1750 RPM. Closed impeller. WORTHITE shaft and fittings.

Type L. Sizes 3" to 8". Capacities to 2250 GPM; heads to 300 ft. Single stage volute. For general service.

The last of the series of fall TAPPI meetings was well attended. Shown here is a group of members and friends at the entrance to the Northern Regional Research Laboratory, Peoria, Illinois, where the meeting was held

Straw Pulping Featured Subject of Peoria TAPPI Meeting

▶▶▶ FINAL TAPPI MEETING of the fall series was held at the Northern Regional Research Laboratory, Peoria, Illinois, on November 15-16, 1948. Sponsored by the Fibrous Agricultural Residues Committee under the chairmanship of S. I. Aronovsky, this conference was given over entirely to the problems involved in the straw pulp industry. Nearly 60 registrants were in attendance.

The scheduled program of the first day covered two main subjects, (1) straw procurement and (2) pulping and refining. On the second day of the conference, the morning was devoted to reports of the subcommittees including the development of a laboratory corrugator and straw preservation experiments. Committee plans for further studies were discussed on Sunday afternoon, Nov. 14, prior to the conference.

The conference was opened by Dr. S. I. Aronovsky and the group was welcomed to the Laboratory by H. E. Roethe, Assistant Director, who outlined the accomplishments and efforts of the Laboratory in the field of residue utilization. This was followed by some remarks on the straw procurement problem by E. C. Lathrop, who acted as moderator for the panel discussion on this subject.

Straw Procurement

First speaker on the panel was G. Adair, Alton Box Board Company. Until 1946, this company purchased straw from brokers who in turn received the straw from the farmer making it virtually impossible for the producer and user to get together. In 1946, Alton started its own Straw Division and by closer contact with the farmer was able to raise the quality of straw purchased. At this time a field ricking program was started. This grew from about 1750 tons in 1946 to over 16,000 tons in 1948. Better quality straw and a more stable supply was achieved by obtaining straw from a greater number of suppliers. Use of more and better field equipment helps lower costs.

J. A. Belford, Ball Bros. Company, pointed out that the greater use of combines and the lack of pickup balers has lessened the supply of available straw. Formerly straw was available in the spring from the farmers' pile but now it must be baled immediately after the combine and then stored either at the mill or in the field. Ball Bros. Company has developed a straw market wherein baled straw is brought by the farmer to a weigh station and then ricked at good central locations. From here it is picked up by a trucker who is thus able to spread his business over the year.

Advertising Helps

Quality and availability of straw have been enhanced by an educational and advertising campaign put on by the Terre Haute Paper Company, according to H. Lyon, the third panel speaker. By obtaining moisture testing instruments that are acceptable to the straw suppliers, this company has saved money. Direct contact with the farmer instead of through brokers has been achieved by a successful advertising campaign and a public relations program. By rejecting inferior straw the company has found it possible to improve quality. Similar to the trend with other users, the number of straw shippers increased from 443 in 1946 to 839 in 1948. Because of the advertising and publicity this company hopes to obtain all of its straw within trucking distance of the mill.

Development of better collection

methods was discussed by U. C. Wisman, Central Fibre Products Company. He pointed out that since 1940 the problems of straw collection have been critical. Development of pickup balers for use with combines has helped, but the high price of those machines, and the high cost of operation and maintenance has been a difficult problem. This company has co-operated with a manufacturer in the development of a successful one man baler which appears to be a real advance. More than seventy such units were in operation last season by farmers supplying straw to Central Fibre Products Company.

Weather conditions are still one of the most important factors in obtaining high quality straw. Greater use of weed killers such as 2,4D should help to eliminate weeds in the straw.

Straw Handling Technique Shown in Movie

At this point in the program a movie entitled *Bringing in the Sheaves* was shown by Mr. Adair, of Alton Box Board Company, in which different types of equipment were illustrated in action. Various techniques of handling straw and the proper methods of stacking were shown. This movie was prepared with the co-operation of various equipment manufacturers and will be used as a part of an educational program for farmers. This was the first public showing of the film.

Following the movie was an open forum in which questions and comments were discussed. The gist of some of these are given. Fire insurance on straw stacks is handled through regular insurance companies by some mills while others build up their own insurance funds. Several companies assist farmers to obtain baling equipment and the consensus of opinion was that renting equipment to the farmer is not satisfactory. Acceptance of instrument moisture determination by farmers may be achieved by breaking open the bale in question for positive proof. While some mills go as far as 700 miles to obtain straw, most straw is procured in the range of 75 to 150 miles from individual mills.

Straw Pulping and Refining

The Monday afternoon session comprised a panel of speakers who discussed various phases of straw pulping and stock preparation. Moderator of this discussion was S. I. Aronovsky.

Straw pulping as carried out in his mill was described by V. E. Bush, Hinde & Dauch Paper Company, Fort Madison, Iowa. Rotary digesters are filled at once, cooked and dumped. Beaters are charged with the roll off the bed plate and the roll is gradually lowered. Furnish contains about 20 per cent paper stock. About one-third of the furnish goes through a disk refiner which does a better job than the beater. Refiners will handle charred fiber, thus permitting the salvage of straw damaged by fire.

The next paper, entitled "Straw Pulp and Stock Preparation," prepared by M. F. Knack, River Raisin Company, was read in his absence by Harry Lamb of the same company. This paper reviewed the main operations in preparing straw pulp—cooking, beating or macerating, washing, refining and screening.

Cookers may be emptied all at once to a storage chest or may be discharged only as needed. Washing may take place in a basket type washer or in a sugar press. The sugar press washer removes some liquor in concentrated form and discharges the stock in a form so that it may be slurried and pumped. Refining takes place in beaters, disk refiners, rod mills and jordans. Wastepaper and broke are usually prepared separately. Flat screens are usually employed but the Jonsson screen is used in some mills.

Cooking Problems

Modified cooking procedures were discussed by B. F. Stahl, Terre Haute Paper Company. Variation in cooking procedure appears to be the starting point in the development of a harder sheet with better compression tests. Without additives the best method is to cook the stock hard. However, if stock is too raw, difficulty is encountered in dumping digesters. Raw stock is also harder to refine. Attempts to use stiffening agents have not been too successful. Various points of application such as the suction tail roll of the machine, at the dryer and at the calender, have been tied.

Some of the problems resolve themselves as follows: (1) What can be done with mixtures of straw to produce an evenly cooked pulp at low cost? (2) What equipment is necessary to reduce refining cycles to a minimum whereby pulp will not be too hydrated which causes slowing down of the machine? (3) Will a press of the sugar press type be a better investment for treatment prior to beating and washing than a multiple disk refiner? (4) Will more cylinders on the machine allow a rawer stock to be run at maximum speeds? (5) Will a more acid or more alkaline pulp run better without causing variations in vat levels and in the suction press vacuum?

N. F. Wilson, Alton Box Board Company, gave the final talk of the afternoon and discussed "single-fill" and "multiple fill" cooking of straw. He pointed out that straw is still cooked by emperical methods rather than scientific methods. The single fill has certain important features: (1) a shorter cook; (2) more production per rotary digester per day; (3) can use a definite formula; (4) can use lower ratio of water, (5) results in more uniform cooking and (6) requires a minimum of beating. Multiple fill operation requires a long cook at low temperatures and pressure. Also the stock is more difficult to wash.

After Mr. Wilson's talk an open forum brought out a number of questions and comments. Operation of disk refiners was discussed in some detail. Use of resins and additives has been studied somewhat but the cost appears too high to be practical. The suggestion was made that some difficulties of cooking and dumping would be eliminated if the straw were cut into short lengths instead of charged to the digester in its original form.

Committee Projects

On Tuesday morning certain of the subcommittees submitted reports and discussed some of the projects that had been under way during the past year. Two projects that drew most attention were straw preservation experiments and the development of a laboratory corrugator.

Borax Best Preservative

Experiments of the past year indicate that borax is the most effective and economical straw preserving agent yet tested on a commercial scale. One ton of crude borax spread over the top of a 400 ton rick of baled straw (about 2/3 lb. per sq. ft. of area) effectively prevented deterioration at an over-all cost of about $75 (including cost of application, labor, etc.). On this basis the cost per ton is less than 20 cents. One company expects to save about $5,000 per year by use of borax. Ordinarily, 5-15 per cent of stacked straw is lost due to spoilage and at the present high cost of straw the savings involved by use of a low cost preserving agent are substantial. Borax is easy to apply and is claimed to not affect the pulping characteristics of straw. Many thousands of tons of straw have been treated with borax with good results.

Experimental work was carried out by seven straw pulp manufacturers and seven chemical companies. By this cooperative effort the basic problem of using chemical preservatives seems to be pretty well solved. This work indicates that borax might be worth experimenting with in treating wood where decomposition takes place readily.

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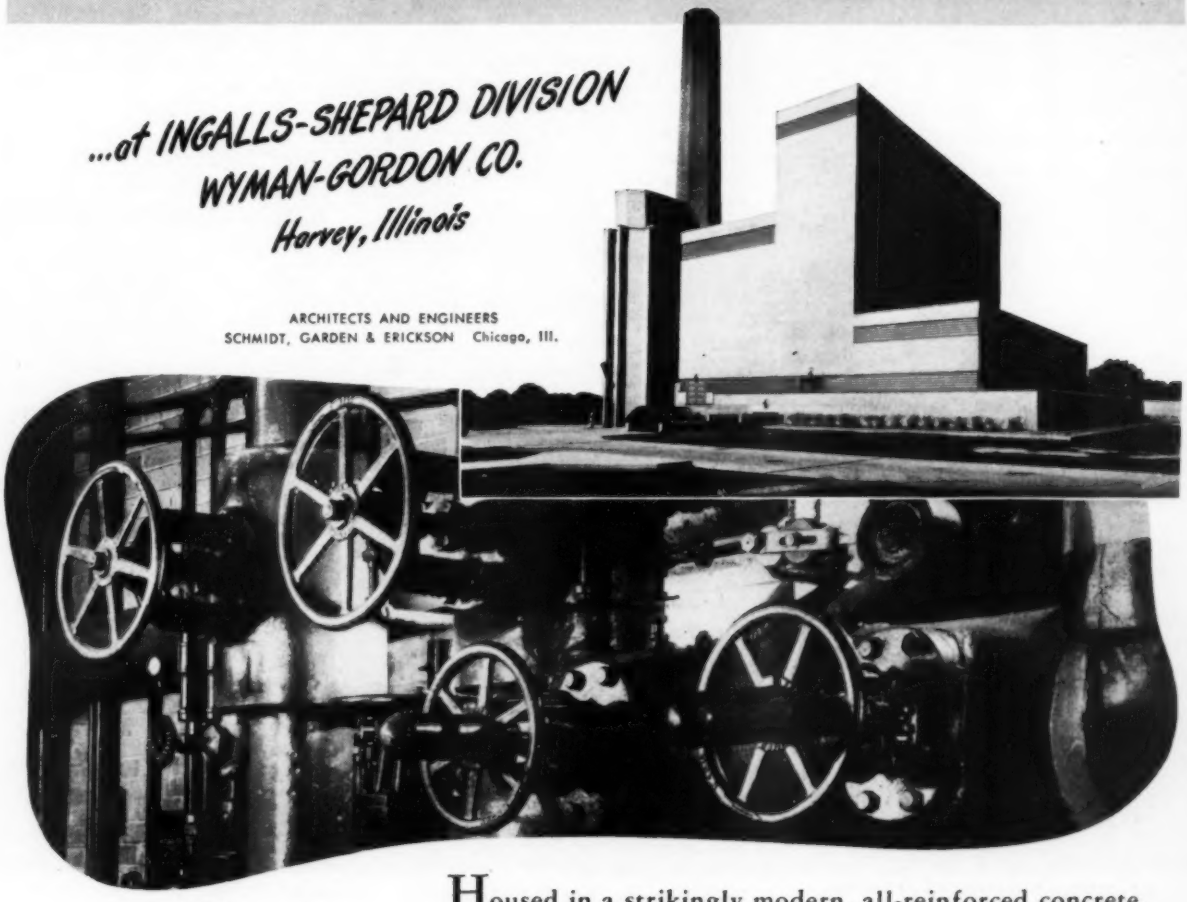

Lunkenheimer Valves are available through Distributors in all industrial centers.

Housed in a strikingly modern, all-reinforced concrete, windowless building, the power plant of this manufacturer's forge shop is a picture of modern efficiency. The list of principal suppliers reads almost like "Who's Who" of power house equipment manufacturers.

Among these big names is that of LUNKENHEIMER . . . identifying high and low pressure valves that serve in multiple installations on lines and equipment.

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While a number of other chemical agents were tested, they did not compare with borax. However, several companies have tried other means of protecting straw piles with some success. Use of laminated asphalt paper for covering straw stacks is now being tried. Sheet metal covering is reported to be too costly. Loose straw piled on top of the stack and held down with wire netting has also been used successfully.

Laboratory Corrugator

Considerable work has been accomplished on development of a laboratory corrugator. The Thwing-Albert Instrument Company, Philadelphia, Pa., has co-operated with the testing subcommittee headed by N. F. Wilson. Slides were shown of a proposed laboratory corrugator and a small model was exhibited. Various factors that must be considered were discussed and it was pointed out that duplication of a commercial unit was not necessary. However, it was also brought out that the three important forces involved (temperature, pressure and shear) must be present in a laboratory unit to make its results correlate with a commercial corugating machine.

Inspection Tour

An interesting part of the program was the plant visits. On Monday afternoon a tour was taken in the plant of Hiram Walker & Sons, Inc., followed by a social hour and cocktail party.

On Monday evening the dinner speaker was L. J. Fletcher, director of training and company relations, Caterpillar Tractor Company, who spoke on the increasing need for better relations between industry and community. Industry should take the initiative to sell itself to the people of the community. The best way to combat Communism is to show the people that our free enterprise system is best for each one of them.

Tuesday afternoon was devoted to inspection trips. First was a tour of the Northern Regional Research Laboratory followed by visits to the Bemis Brothers Bag Company and to the new Diesel engine plant of the Caterpillar Tractor Company.

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▶▶▶ THREE FILMS FOR the Georgia Department of Forestry are under production by the Southern Educational Film Production Service at the University of Georgia in Athens. Produced in co-operation with the Southern Pulpwood Conservation Association, these films will deal with regeneration of pines, planting procedures and fire protection.

CAN. TECHNICAL SECTION WILL HOLD 1949 ANNUAL MEETING AT MONTREAL

The 1949 Annual Meeting of the Technical Section, Canadian Pulp and Paper Association, will be held in the Mount Royal Hotel, Montreal, P.Q., on January 26, 27 and 28.

The program will cover all phases of pulp and paper manufacture, including subjects of interest to management and operating personnel. Some of the papers listed on the tentative program are as follows:

Corrosion of Alkaline Pulping Mill Equipment

Reduction of Maintenance Costs on Barking Drums through Application of Welding

A Means of Increasing Decker Wire Life

New Developments in Engineering Improved Wood Room Layout

The Role of Sectional Electric Paper Machine Drives in a Modernization Program

Hypothetical Application of Heat Pumps to Paper Machine Dryers

Groundwood Mill and Screen Room Heating and Ventilation

An Improved Stoker Capable of Handling all Types of Canadian Coals

Industrial Relations

Instrumentation Studies — Mullen Tester

Analysis of Kraft Liquors

Modified Mullen Tester in Use at Iroquois Falls

Steam Jet Refrigeration System for Sulphite Acid Making

Treatment of Slime with Hypochlorite

Wheat Straw for Improved Paper and Board Products

Each year the standing committees of the Section arrange informal group discussions on various phases of activity in the Industry. As demonstrated in the past, the enthusiasm and evident interest in the topics discussed at these sessions, assures the success of such group discussions.

Group Dicussions, to be programed by the Engineering and Heat and Power Committees are not finalized but will be included in the program.

It is expected that an official visit to the Pulp and Paper Research Institute of Canada will be programed, so that delegates may see the new pulping laboratory and other facilities of the Institute. Opportunity will be afforded delegates to discuss with members of the staff, the intensive research program at the Institute.

Each year the Technical Section welcomes an ever increasing number of visitors from all over the world, to its annual meeting. Non-members of the Technical Section are welcome to attend both the annual and summer meetings of the Section, and it is hoped that many newcomers will be able to attend the forthcoming convention.

The Technical Section does not handle room reservations. Requests for accommodations should be addressed directly to the hotel and should include information concerning arrival and departure times. Delegates are requested to advise the hotel of any changes in plans concerning hotel accommodation.

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SUPERINTENDENTS 1949 CONVENTION WILL BE HELD IN ATLANTIC CITY

A recent announcement from the office of The American Pulp and Paper Mill Superintendents Association, Inc., sets the dates of the Association's 1949 annual convention as June 15-17. The place of the meeting, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

It is expedient that those who plan to attend the convention make early reservations. Direct communications about reservations to Haddon Hall, Atlantic City, New Jersey.

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▶▶▶ ONE OF ITS MOST successful conventions was held by the National Paperboard Association at the Waldorf Astoria, New York City, November 11 and 12. George E. Dyke of Robert Gair company was elected president, and W. H. Beckwith of Morris Paper Mills was re-elected vice president. The nominating committee's recommendations for the members of the board of directors was adopted without contest. Frederick C. Becker was re-elected general manager, and Harry S. Adler was re-elected secretary-treasurer.

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AMERICAN STANDARDS ASS'N TO HOLD FIVE-DAY SEMINAR

A private five-day seminar will be held by the American Standards Association January 24 through January 28, 1949, in the Engineering Societies Building, New York City. The conference, to be presided over by Dr. John Gaillard, will present the organization and technique of standardization work, particularly in individual companies.

Dr. Gaillard is mechanical engineer on the staff of the American Standards Association and lecturer in industrial standardization at Columbia University. The seminar will consist of ten conferences, two being held every day, at 9:30 a.m. and 2:00 p.m. At each conference, Dr. Gaillard will present a lecture which will be followed by round-table discussion of questions of special interest to those attending.

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In this shop--one of the largest and most modern in the industry--have been built the widest and fastest paper machines running in this country today. Over the years machines for the manufacture of news, tissue, board, kraft, book, bond, and other papers necessary to industry have been produced in this shop for mills in every corner of the globe.

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WATERTOWN, NEW YORK

Old-Timers Night at Michigan Division Superintendents Ass'n

▶▶▶ OLD-TIMERS were honored at a meeting of the Michigan Division of The American Pulp and Paper Mill Superintendents Association, Inc., held at Hotel Harris, Kalamazoo, November 18. About 90 members and guests were present.

Allan B. Milham, who acted as toastmaster, welcomed seven past presidents of the national association who were present. Also among the national officers present known to the old-timers was Peter J. Massey, St. Regis Paper Company. Mr. Massey was elected secretary-treasurer of the Association at its initial meeting in Appleton, Wisconsin, on June 4, 1919 and continued in this capacity until 1924.

Brief remarks were made by each of the past presidents with the exception of William Brydges who spoke for some time on his recent trip to Europe. He was followed by Harry D. Eliason, executive vice president, Cellulose Sales Corporation. Mr. Eliason stressed some observations made while on a trip to Finland recently.

Special features of the meeting included a film on logging operations in Ontario. William Schlafge, assistant superintendent, Minnesota and Ontario Paper Company, International Falls, Minnesota, acted as film commentator.

A series of lantern slides of portraits with biographical material designated as Names to Remember was presented by Harry E. Weston, associate secretary-treasurer of the National Association. Participating in this contest were Merton S. Fogerty, Sutherland Paper Company, who won first prize; E.T.A. Coughlin, of Charles T. Main, Inc., second prize; and Harry Bradford, of Rex Paper Company.

Greetings in the form of letters and wires came from the following men in the industry who were unable to be present:

D. C. Everest, president and general manager, The Marathon Corporation, who was on the program as one of the feature speakers; Fred C. Boyce, first active president of the National Association; Charles H. Reese, first vice president, and Charles Ackley, third vice president of the National Association; E. H. ("Dad") Gilman, oldest living member of the Michigan Division, now 84 years of age, residing at Coloma, Michigan.

Past presidents of the National Association, present at the dinner, were: John H. O'Connell, consultant, Washington, D.C., president, 1922-1923; E. T. A. Coughlin, Richland, Michigan, representative of Charles T. Main, engineers, Boston, president 1926; Carl Magnus, Green Bay Paper and Pulp Company, Green Bay, Wisconsin, president, 1931; Roy H. Kelly, Marathon Corporation, Rothschild, Wisconsin, president, 1932; William H. Brydges, Lynchburg, Virginia, president, 1933; Grover Keeth, Marathon Corporation, Rothschild, Wisconsin, president, 1943; Raymond L. Barton, Michigan Paper Company, Plainwell, Michigan, president, 1945-1946.

Among the 20 old-timers present were Robert B. Stewart, Kalamazoo Vegetable Parchment Company, and Abe Vandenberg, retired.

Present also at the dinner was Allan Hyer, former head of the Paper Division of the War Production Board. Mr. Hyer is now with Bagley and Sewall Company, Watertown, New York.

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▶▶▶ SIX RADIO dramas, entitled "Bill Scott, Forest Ranger," will be made available soon by the U. S. Forest Service in co-operation with the New York City Board of Education. They will be in the form of transcriptions.

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PACKAGING MACH'Y MFRS. INSTITUTE ELECTS OFFICERS

New officers for the coming year were elected at the sixteenth annual meeting of the Packaging Machinery Manufacturers Institute held October 12-13 at the Roosevelt Hotel, New York. They are as follows: president, H. Kirke Becker, Peters Machinery Company, Chicago, Illinois; vice presi-

Attending the annual old-timers banquet of the Michigan Division of The American Pulp and Paper Mill Superintendents Association were: (L to R) Seated—Roy H. Kelly, Carl Magnus, E. T. A. Coughlin, and John H. O'Connell. Standing—Raymond L. Barton, William H. Brydges, Allan B. Milham, who acted as toastmaster; Grover Keeth, and Peter J. Massey

dent, John P. Corley, Miller Wrapping & Sealing Machine Company, Chicago, Illinois; and, vice president, Edward G. Kuhn, Consolidated Packaging Machinery Corporation, Buffalo, New York. H. L. Stratton is secretary-treasurer of the institute which has offices at 342 Madison Avenue, New York City.

"New Developments in Packaging Machinery" was the subject of a talk by George W. von Hofe, retiring president. Mr. von Hofe listed outstanding developments in 1949 and emphasized the factors in development costs for packaging machinery.

The Packaging Machinery Manufacturers Institute will hold its spring meeting on May 9, 1949, at the Hotel Dennis, Atlantic City, New Jersey.

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DU PONT ENTERTAINS WEST. NEW YORK GROUP OF TAPPI

An excellent lesson in technical process control was given to approximately 50 members of the Western New York Group, TAPPI, as guests of the DuPont Company in a tour of the Rayon Plant on River Road, Tonawanda, New York.

At the dinner meeting, which followed the plant tour, members and guests listened to an excellent talk by Dr. E. P. West, technical superintendent of the Rayon Plant, on all phases of the rayon industry. Dr. West cited the phenomenal growth of the world rayon industry which, he said, has advanced in 56 years from the test tube stage to an annual production of almost one and one-half billion pounds, and sets the pace for other synthetic fibers.

The meeting was conducted by G. H. Rand, Jr., International Paper Company, Niagara Falls, New York, who gave a short preview of coming meetings, and extended the thanks of the group to the DuPont officials for their excellent handling of the plant tour. Ralph Prince, secretary-treasurer of the Empire State Section of TAPPI, was among those present; he gave a report on the current membership drive in the local groups.

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▶▶▶ THE DATE FOR the second Pacific Chemical Exposition by the California Section of the American Chemical Society for 1949 has been set for November 1 through 5 at the San Francisco Civic Auditorium. The floor plan for the 1949 show is scheduled to be in the hands of former exhibitors on the morning of January 3, 1949. As in 1949, the Pacific Industrial Conference will run concurrently with the Pacific Chemical Exposition.

COMING EVENTS

Jan. 11—TAPPI (Pacific Section) will meet in Seattle, Wash.

Jan. 15—Joint meeting of Miami Valley Division Superintendents Association and Ohio Section TAPPI at the Manchester Hotel, Middletown, Ohio.

Feb. 9—Annual meeting of the Southern Pulpwood Conservation Association will be held at the Atlanta Biltmore Hotel, Atlanta, Georgia.

Feb. 20-25 — Annual meeting of the American Paper and Pulp Association and paper groups, at the Waldorf-Astoria Hotel, New York City.

Feb. 20-25—Annual meeting of the Technical Association of the Pulp and Paper Industry, at the Commodore Hotel, New York City.

Apr. 8—TAPPI (Pacific Section) will meet in Longview, Wash.

June 15-17—Annual convention of the Superintendents Association will be held at Chalfonte-Hadden Hall, Atlantic City, New Jersey.

STATED MEETINGS

Chicago Professional Paper Group meets the third Monday of each month at the Chicago Bar Association, Chicago, Ill. (except July and August).

What do you know about Paper?

Write Now for YOUR COPY of DRAPER'S ATLAS of AMERICAN PAPERMAKING

It is free of charge to anyone actually engaged in pulp or paper making.
To all others—$2.00 a copy.

The DRAPER Felt

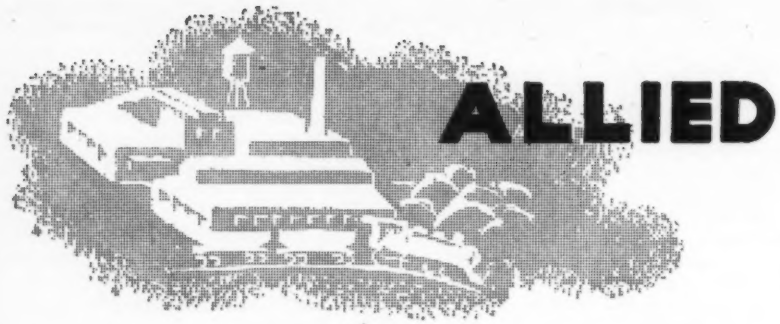
DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASSACHUSETTS

RALPH E. BRIGGS, Sales Manager
BRADFORD WEST, Pittsfield, Mass. — WILLIAM N. CONNOR, Jr., Canton, Mass. — L. H. BREYFOGLE, Kalamazoo, Mich.
WALTER A. SALMONSON, 519-20 White Bldg., Seattle, Wash. — L. L. GRIFFITHS, Jr., Kalamazoo, Mich.

Answer to Question No. 12 — Arizona



WYANDOTTE CHEM. CORP. ACQUIRES CLAY DEPOSITS

The manufacturing facilities and clay deposits of the Blue Mountain Clay Company, Inc., have been acquired by the Wyandotte Chemicals Corporation, Wyandotte, Michigan.

Acquisition of the Mississippi property is in line with Wyandotte Chemicals' policy of controlling basic raw materials that are used in manufacturing, thus insuring continued high quality and constant supply of Wyandotte products. During World War II, a deposit of hydrous montmorillionite, a claylike mineral with especially valuable oil and water absorbent properties, was discovered in Mississippi. Soon after the war a processing plant was constructed to market this new mineral, now known as Wyandotte Zorball.

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OAKITE HOLDS SERIES OF TECH.-SALES CONFERENCES

A series of technical-sales conferences were held by the Oakite Products, Inc., New York City, in New York, Chicago, and Kansas City during November. The central theme of the series was how recent developments in the field of cleaning and allied procedures are helping industry to combat rising production costs.

The first of these regional conferences, held in New York, incorporated a program of lectures and round-table discussions attended by field service representatives of the company's New England, New York, Philadelphia, Southern and Canadian sales divisions.

Similar conferences held in Chicago and Kansas City were attended by Oakite field service representatives from the Chicago, Detroit and Central division, and the Pacific Coast, Midwestern and Southwestern sales territories respectively.

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D. J. MURRAY MFG. CO. FORMS 25-YR. CLUB

A dinner meeting sponsored by D. J. Murray Manufacturing Company, Wausau, Wisconsin, for employees and officers with over 25 years of service with the company, was held October 15, at the Hotel Wausau.

Following the dinner, the Murco Quarter-Century Club was organized. The officers elected for the ensuing year are: F. C. Boyce, president; S. D. Payzer, vice president; and A. W. Plier, permanent secretary. Mr. Plier is not yet eligible to membership in the club.

The charter members of the club, each name being followed with the number of years of his service to the firm are: Gustav Behnke (42), J. T. Reynolds (41), Michael Thomas (38), Otto Haase (37), Arthur Wiren (36), Charles H. Hahn (32), J. W. Johnson (31), E. A. Roberts (30), William G. Koch (38), Peter Robinson (28), D. C. Everest (27), Fred C. Boyce (27), M. P. McCullogh (27), Otto Woehlert (26), and S. D. Payzer (25).

Each of the veterans at the dinner was presented with a gold wrist watch and a certificate, showing his years of service. The presentations were made by F. C. Boyce, president, who in turn was presented with a watch and certificate by D. C. Everest, a member of the board of directors.

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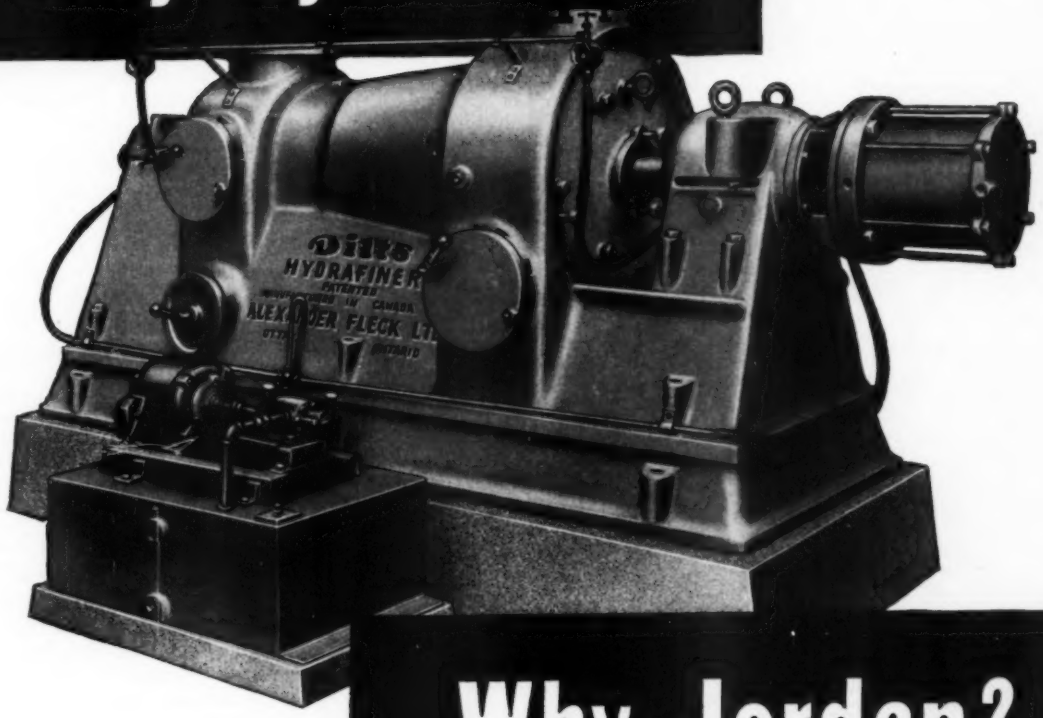
CONTROL OF MIDVALE COAL COMPANY IS ACQUIRED BY PITTSBURGH PLATE GLASS

Controlling stock interest in the Midvale Coal Company, an Ohio corporation, has been acquired by the Pittsburgh Plate Glass Company, Pittsburgh. The coal company is being liquidated and its mine will be operated as the Columbia Coal Division of the Pittsburgh Plate Glass Company.

Located near New Philadelphia, Ohio, the Midvale operation is a deep mine currently producing about 2,800 tons daily. Coal reserves are estimated as sufficient for 30 years. Equipped with the newest mining machinery, the mine is highly mechanized. About 60 per cent of Midvale's daily production will be shipped by truck to the Barberton plant of Pittsburgh Plate Glass

Group in attendance at first of a series of regional conferences given by Oakite Products, Inc., at Hotel Pennsylvania, New York City

Why Hydrafine?



Why Jordan?

Only mills equipped with HYDRAFINERS, or Hydracycle systems, are able to Hydrafine their stock—retain the fibre length required for strength.

There are in the U. S. and Canada many mills "making" their stock in such equipment, using their jordans for control only.

In tissue mills alone there are at least 100 HYDRAFINERS, or Hydracycle systems, ahead of the jordans, Hydrafining the stock to add strength.

At least 300 HYDRAFINERS, or Hydracycle systems, are operating on a wide range of stocks—for kraft bag and wrapping, paper boards, fine papers and various specialty papers, as well as on tissues.

Hydrafine your stock to develop strength by brushing, fibrillating, and rubbing while maintaining fibre length. Jordan your stock to cut and control it on the machine. Then go into the market with improved grades—Hydrafined grades.

Consult Shartle or Dilts in the U. S.
Consult Fleck in Canada.

SHARTLE BROS. MACHINE COMPANY, MIDDLETOWN, OHIO
DILTS MACHINE WORKS, FULTON, NEW YORK

DIVISIONS OF THE BLACK-CLAWSON COMPANY, HAMILTON, OHIO

Western Sales Office: R. T. Petrie, Mayer Bldg., Portland, Oregon

Associate: ALEXANDER FLECK LIMITED, Ottawa, Ontario, Canada

HYDRAFINERS FOR STRENGTH

Company and the balance sold to regular commercial customers. Purchase of the coal company will insure the Barberton plant of a constant supply of uniform grade of high quality fuel.

Paul C. Beutel, associated with the Columbia Chemical Division since 1936, has been appointed manager of the Columbia Coal Division operation. V. L. Henry, president of the Creighton (Pennsylvania) Fuel Company, served as company consultant during negotiations toward purchase of the Midvale Coal Company, and will continue to serve as a consultant in the operation of the Columbia Coal Division.

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G-E OPENS NEW MOTOR PLANT ON PACIFIC COAST

A $3,000,000 motor manufacturing plant, which at peak production will be able to turn out more than 1,500 electric motors weekly, was officially opened by the General Electric Company at San Jose, California.

The San Jose factory, situated on a 57-acre tract, which allows for multiple expansion of the present building, ultimately will produce all of the company's output of single-phase capacitor integral motors. One of the largest and most modern industrial plants in central California, the 144,000 square-foot factory already is producing electric motors, ranging from 1 to 500 hp, at the rate of several hundred weekly.

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HARRIS-SEYBOLD NO LONGER SUPPLIES PARTS FOR LINE OF OBSOLETE MACHINES

In line with a standard obsolescence policy, machine status changes have been announced by Harris Seybold Company, Cleveland, Ohio, for 17 models of presses and cutters. This action affects the supplying of parts for older machines that are no longer manufactured.

Each machine that has been and/or is being manufactured by the firm falls into one of three classifications.

Active — Those models which are currently being manufactured.

Inactive — Those models which are no longer being manufactured, but for which certain parts will be supplied. In this respect, parts that have not been ordered for seven consecutive years cannot be supplied.

Dead — Those models which have reached an age where the supplying of any service parts is no longer practicable.

Changes in the status of machines are made only after exhaustive study of parts service and manufacturing records. Wherever possible, the company has notified customers possessing machines affected by changes in status, so that they may anticipate their service parts needs prior to the closing date of March 1, 1949. If available, blueprints will be furnished upon request for parts that are no longer supplied.

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▶▶▶ THE FORMATION OF a new corporation exclusively devoted to research, development and distribution of nonmetallic minerals was announced

C. A. Frankenhoff

recently by C. A. Frankenhoff, president of the new organization. The company, known as the Frankenhoff Corporation, specializes in high quality diatomaceous earth products. A. G. Frankenhoff is vice president, and both the Frankenhoff's bring to the organization a broad base of experience in the manufacture, processing and distribution of nonmetallic minerals.

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▶▶▶ THE ESTABLISHMENT OF Sherbrooke Machineries, Ltd., Sherbrooke, Quebec, as Canadian representative for the pulp and paper industries, was announced by the Askania Regulator Company, manufacturers of many types of industrial controls. Sherbrooke will handle all types of Askania equipment, including the Askania Consistency Regulator.

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EPIC OF STEAM PORTRAYED IN B&W SOUND-COLOR FILM

An educational film, *Steam for Power,* released by the Babcock & Wilcox Company, New York City, depicts the development and application of modern steam boilers. This sound film, which is in color, will be of interest to civic groups, professional societies, engineering students and those interested in the production and use of power.

Making extensive use of both animation and photography, this film traces the important steps in the history of man's efforts to obtain more abundant and economical power by using steam to harness the energy released by the combustion of fuels.

Each step in the development of modern boilers and the reason for it is shown. Also shown, are the significant steps in the manufacture of boiler components. The concluding sequences of the film show the erection of a large radiant boiler in one of the country's outstanding power stations.

The 16 mm sound-color film has a running time of 41 minutes.

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▶▶▶ A NEW FREE machining alloy steel is now available for shipment from warehouse stock of the Joseph T. Ryerson & Son, Inc., Chicago, Illinois. The new steel will be sold under the trade name of Rycut.

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FOXBORO PLANS ENLARGED PROGRAM OF INSTRUCTION

Plans for an enlarged program of instruction has been announced by the Foxboro Company, Foxboro, Massachusetts. Emphasis will be placed on application of correct instrumentation for specific industries, in addition to training in the use and maintenance of instruments in general. Courses already scheduled in the new program, which begins January 10, will deal with instrumentation in the refinery and chemical process industries, textiles, pulp and paper, food and wood processing.

Each course will include two weeks of study, class work and shop practice with the various basic types of instruments, followed by three full days devoted to the special problems of measurement and control in the processes of a specific industry. Instruction will be under the leadership of qualified men from the company's staff of engineers.

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H. K. FERGUSON CO. NOW HAS OFFICE IN CHICAGO

A new sales office has been established in Chicago by the H. K. Ferguson Company, industrial engineers and builders of Cleveland, Ohio. The office will be located at 120 S. LaSalle Street and will be managed by L. Douglas Lacy, formerly of the company's main office in Cleveland.

The office was opened to supply an increasing demand for industrial engineering and building services in the Chicago area. The Ferguson Company

has been active during its 30 years operation, in and around Chicago, where it has engineered and built many structures for leading industrial organizations.

Mr. Lacy, the new manager, has been in the engineering field for many years. He has had widely varied experience ranging from directing his own firm to serving as manager of the contract department of Vermilya-Brown Company, New York.

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PAISLEY PRODS. CO. HAS ACQUIRED ADHESIVE CO.

Purchase of the Park Leggett Altman Company, industrial adhesive manufacturers of Minneapolis, Minnesota, has been made by Paisley Products, Inc., New York City. The deal included all assets of the firm, formulas, manufacturing processes and equipment. Improvement of plant and technical facilities is planned, increasing distribution of Paisley products.

Mr. Calvert Leggett, former president of the Park Leggett Altman Company, will join Paisley as general manager of the new division.

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▶▶▶ AN ADDITION to the plant of Samuel W. Langston Company, Camden, New Jersey, is announced. The second floor area of the combination two-story and single-story building will tie in with the present locker and wash room so that the space for these facilities may be doubled. The first floor area will be used primarily as machine assembly floor, but will also provide space for a number of additional machine tools. It is expected that the building will be ready for use by the end of February.

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▶▶▶ PLANS FOR EXPANSION and modernization of the Glidden Company's Naval Stores Division plant at Valdosta, Georgia, will make what is claimed will be the largest pine gum producing plant in the world. The program will be carried out during a 45-day period this winter. It will incorporate every new and proven advance in the technology, equipping and engineering of gum rosin and turpentine production. When the program is completed, the plant will be capable of processing more than 150,000 barrels of pine gum a year.

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▶▶▶ THE NEW ADDRESS of the Detrex Corporation is 625 South Anderson Street, Los Angeles 23, California, telephone number Angelus 9-1185. The Detrex Corporation is a manufacturer of cleaning solvents.

CLARK

MATERIAL HANDLING *News*

a BIGGER exhibit of BETTER machines TO DO MORE WORK AT LOWER COST

the Third National Materials Handling Exposition

The 1949 Exposition will be held in Philadelphia January 10 through 14 and will constitute a broad view and preview of "industrial history in the making." It will be the most convincing demonstration of all time that the Science of Materials Handling is eternally new—that it is a never-ending process of evolving new and better methods and equipment to the end that our National economy can shake off the shackles of old, inefficient and time-consuming practices which have become prohibitively costly both in human energy and in dollars.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIV., CLARK EQUIPMENT COMPANY BATTLE CREEK 22, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

GREEN CROSS FOR SAFETY SAFETY

PRESIDENT'S CONFERENCE ON INDUSTRIAL SAFETY

A long-term program of co-operative action by management, labor and government was the objective of the President's Conference on Industrial safety, which was attended by about 350 persons. A telegram sent by the President while en route on his special train was read by John R. Steelman, Assistant to the President, before the Conference when it opened in Washington September 27 for a three-day organization meeting.

A highlight from the President's message formed the theme of the gathering. Commenting on the industrial accident toll, he said:

"This great national tragedy must be stopped. We must not subject these workers and their families to needless suffering and insecurity. We must not deprive our country of their production, which is now so necessary, if we are to meet our domestic and foreign obligations. Maintenance of our position of world leadership and our own standard of living depend upon full production. . . . I hope you will resolve at this conference to develop a long term co-operative plan of action to preserve the Nation's most precious asset, the lives of its people."

The following persons, actively engaged in safety work in pulp and paper mills, attended the Conference and are participating in the work of the various committees:

Otto Hartwig, general safety supervisor, Crown Zellerbach, Inc., Portland, Oregon

George W. Harper, director of safety, The Mead Corporation, Chillicothe, Ohio

E. B. Lambton, safety engineer, St. Regis Paper Company, New York City

L. A. Gibson, safety director, Niagara Box Factory, Inc., New York City

Hazel Leedke, R.N., Thilmany Pulp and Paper Company, Kaukauna, Wisconsin

Arthur Nelson, chief forester, Flintkote Company, Meridian, Mississippi

J. Fred Berry, personnel manager, Alton Box Board Company, Alton, Illinois

John M. Roche, manager, Industrial Department, National Safety Council, Chicago

Fred W. Braun, vice president and chief engineer, Employers Mutual Insurance Company, Wausau, Wisconsin

John Sherman, 4th vice president, International Brotherhood of Pulp, Sulphite and Paper Mill Workers of the United States and Canada, Tacoma, Washington.

The preliminary work already done by the committees and subcommittees will form the basis of recommendations for a long-range program of procedures. The entire program will be based on surveys of problems of engineering, research, education, laws and standards, accident records, labor-management cooperation and the development of plans and services for all types and sizes of businesses. The accomplishment of all objectives necessarily will require active participation of the States.

Another meeting of the Conference is scheduled for March, 1949.

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NATIONAL SAFETY COUNCIL PRESENTS DSS AWARD TO MEAD'S CHILLICOTHE DIV.

The Chillicothe (Ohio) Division of the Mead Corporation, which has been a member of the National Safety Council since October 26, 1916—just three years after the Council was founded—has been presented with the Council's Distinguished Service to Safety Award.

The Mead plant, the first paper company in the State of Ohio to receive the DSS, operated a million and a half man-hours without a disabling injury, during the period from June 25 to November 10, 1948. In addition, to this achievement, the Division's frequency in 1947 was about one-fourth of the entire industry. Similarly, the severity was about one-seventh that of the entire pulp and paper industry. The DSS award to the Chillicothe Division is the fourth such award to be given within the pulp and paper industry covering the United States and Canada.

The presentation of the award, symbolized by a flag, was made by E. P. Marconi, staff representative of the National Safety Council, at special ceremonies held in Chillicothe on November 11. Division Manager H. E. Teter, who received the flag, said "We consider this to be a great honor, and we will fly this flag with considerable pride. We have been interested in safety because it prevents injury and suffering to our people."

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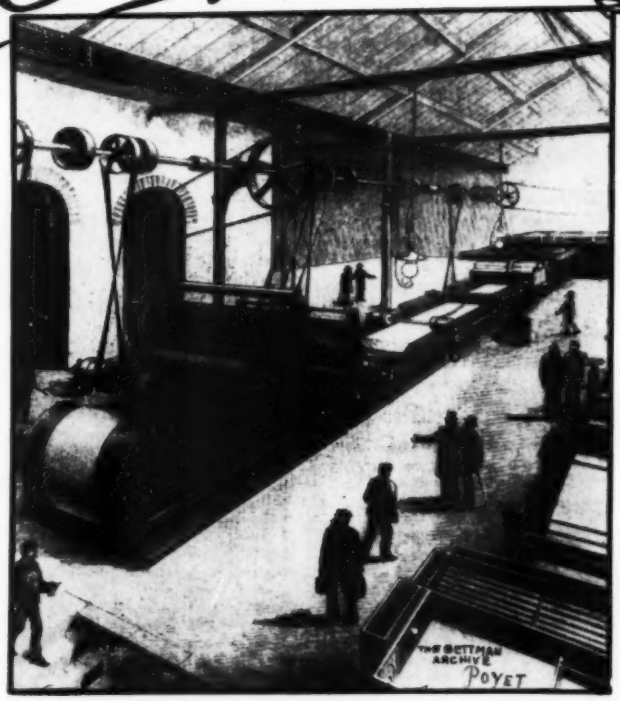
ACCIDENT PREVENTION SUBJECT OF E. A. BROWN IN CONFERENCE TALK

The outstanding part the safety program of the pulp and paper manufacturing industry and its workers have played in preventing accidents was stressed by A. E. Brown, vice president of the International Brotherhood of Paper Makers, at a joint labor and management conference of the industry held in Salem, Oregon, November 18.

G. W. Charters, assistant resident manager of the Camas division of the Crown-Zellerbach Corporation, declared too much is taken for granted in accident prevention work and that

The DSS Award, given by the National Safety Council to the Chillicothe (Ohio) Division of The Mead Corporation, was officially presented by E. P. Marconi, NSC staff representative. Left to right: Mead's Division Manager, Howard Teter; Francis Wagner, safety director for the division; and Mr. Marconi

Paper Making 60 YEARS AGO



Paper making was an art as the early paper maker made one sheet at a time. Production was limited to the individual effort of the paper maker. As this art grew into an industry machines began to take the place of the individual. . . . Tons of paper were produced quicker than sheets by the paper machine. Mass production was born.

Even as the early paper maker used felts to make paper, placing felt layers between the sheets to remove the water, mass production of paper requires felts.

As the art grew into an industry felts developed with the industry always keeping pace with production methods. Since 1890 Appleton felts have kept pace with paper making; today they are preferred by mills everywhere.

This is one of a series depicting early history of paper making.

APPLETON WOOLEN MILLS

APPLETON
WISCONSIN

educational programs frequently are launched but are not carried out.

Each speaker, following delivery of his topic, acted as chairman in a round-table discussion of related subjects. The basic purpose of the conference is the same as that adopted in 1946 and includes consideration of safety education, accident prevention, and first aid.

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▶▶▶ IN RECOGNITION of one million man hours worked without a lost time accident, the National Safety Council's "Award of Honor for Distinguished Service to Safety" was presented to the Port Angeles, Washington, division of the Crown-Zellerbach Corporation. The presentation was made by Dan Adair, safety supervisor for the state department of labor and industries. Only 176 firms in the entire nation have received the award since it first was started in 1942, and this was the first to be made in the state of Washington.

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SAFETY SCORES

▶▶▶ THE INJURY FREQUENCY rate in October for all contestants in the paper industry was:

Division I—11.26, compared with 11.63 in September and 12.65 for the three months, July-September.

Division II—12.47; this was higher than the rate of 12.09 in September, but was still well below the July-September cumulative rate of 14.03.

Of the October reports received from 287 contestants, 131, or 46 per cent, worked the entire month of October without a reportable injury. The list of perfect scores follows:

Division I—Paper and Pulp Mills

Group A

Mead Corporation, Chilicothe, Ohio.
Price Bros. & Co., Ltd., Kenogami, Quebec, Canada.
Champion Paper & Fibre Co., Houston, Tex.

Group B

West Virginia Pulp & Paper Co., Tyrone, Pa.
International Paper Co., Ticonderoga, N. Y.
Owens-Illinois Glass Co. (American Coating Mills Div.), Elkhart, Ind.
Crown-Zellerbach Corp. (National Paper Products Div.), Port Townsend, Wash.
Howard Smith Paper Mills, Ltd., Beauharnois, Que., Canada.
Crown-Zellerbach Corp., Port Angeles, Wash.

Group C

Blandin Paper Co., Grand Rapids, Minn.
Price Bros. & Co., Ltd., Jonquiere, P.Q., Canada.
Certain-teed Products Corp., York, Pa.
Certain-teed Products Corp., Marseilles, Ill.

Group D

Certain-teed Products Corp., Niagara Falls, N. Y.
United States Gypsum Co., Lisbon Falls, Me.
Container Corp. of America, Circleville, Ohio.
Container Corp. of America, Carthage, Ind.
Hollingsworth & Whitney Co., Waterville, Me.
Armstrong Cork Co., Pensacola, Fla.
Certain-teed Products, Richmond, Calif.
Hollingsworth & Vose Co., West Groton, Mass.
Manistique Pulp & Paper Co., Manistique, Mich.
Certain-teed Products, Dallas, Tex.
Marathon Corp., Ashland, Wis.
National Gypsum Co., Kalamazoo, Mich.
Mead Corp. (Wheelwright Div.), North Leominster, Mass.
Certain-teed Products, Kansas City, Mo.
Strathmore Paper Co. (Mill No. 1), Woronoco, Mass.
Container Corp. of America (Calif. Container Div.), Los Angeles, Calif.
American Writing Paper Corp. (Albion Div.), Holyoke, Mass.
Fort Wayne Corrugated Paper Co., Vincennes, Ind.
Riegel Paper Corp., Riegelsville, N. J.
National Gypsum Co., Newburgh, N. Y.
American Writing Paper Corp. (Mt. Tom Div.), Holyoke, Mass.
Kimberly-Clark Corp. of Canada, Ltd., Kapuskasing, Ont., Canada.
Spaulding Fibre Co., Inc., North Rochester, N. H.

Division II—Paper and Board Remanufacturing

Group A

Lily Tulip Cup Corp., College Pt., N. Y.
Flintkote Co., East Rutherford, N. J.
Gaylord Container Corp., Bogalusa, La.

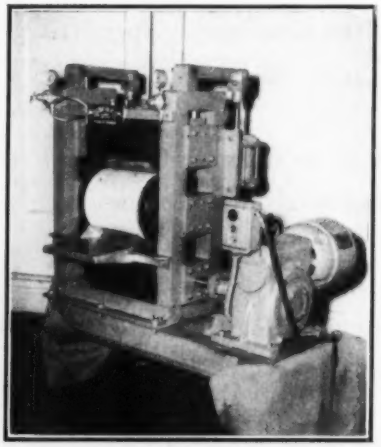
Group B

Canadian Cellucotton Products Co., Ltd., Niagara Falls, Ont., Canada.
Container Corp. of America, Cleveland, Ohio.
Container Corp. of America, Anderson, Ind.
Old Colony Envelope Co., Westfield, Mass.
A. B. Dick Co. (Lake St. Plant), Chicago, Ill.

Group C

Allied Paper Mills (Bardeen Div.), Kalamazoo, Mich.
Gaylord Container Corp., Atlanta, Ga.
Kimberly-Clark Corp., Appleton, Wis.
Marinette Paper Co., S. Glen Falls, N. Y.
South West Box Co., Sand Springs, Okla.
Gaylord Container Corp., Tampa, Fla.
Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.
Research Products Corp., Madison, Wis.
Certain-teed Products, Buffalo, N. Y.
Hankins Container Corp., Chicago, Ill.
Orchard Paper Co., St. Louis, Mo.
Pillsbury Mills, Inc., Wellsburg, West Va.
Green Bay Box Co., Green Bay, Wis.
Flintkote Co., Hollywood, Calif.
ABC Corrugated Box Co., Keokuk, Iowa.
Bay West Paper Co., Green Bay, Wis.
Container Corp. of America, Atlanta, Ga.

Twenty Years of Experience...



This laboratory calender is equipped with air loading, steam heating of iron rolls, and complete safety guards to protect hands of operators. It is entirely anti-friction and is made as a complete unit permitting setting anywhere without special foundation.

Available to help solve your problem in finishing paper, whether it be filled rolls for calendering or embossing, rebuilding your present equipment for higher speed, closer controlled operation, or new equipment to do your specialized job. Our engineering and technical departments are trained to tailor equipment for your specific need.

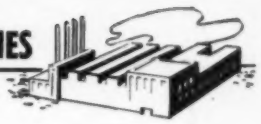
Products

Supercalender Rolls
Embossing Rolls
Decorating Equipment
Supercalenders
Embossing Calenders
Calender Rebuilding
Special Converting Equipment

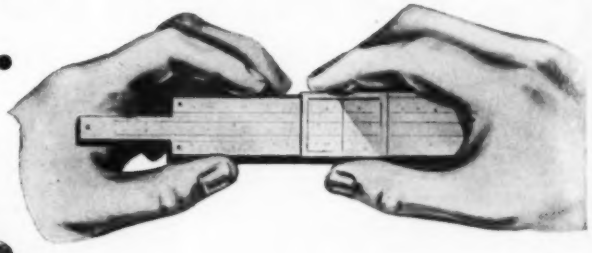
The Wheeler Roll Company

1910 Lane Blvd. • Kalamazoo 24, Michigan

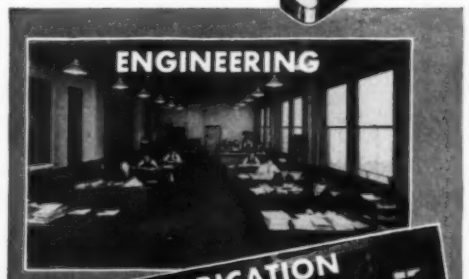
WHEN YOU ARE MAKING PLANS FOR NEW POWER FACILITIES

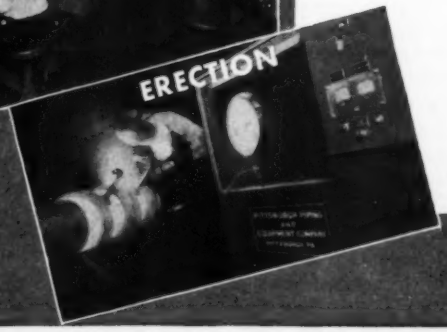


No Matter How You Figure It . . .



. . . It Pays to Turn the Complete Piping Job Over to P. P. & E.





Whether you look at it from an engineering or management viewpoint, it pays to entrust the complete responsibility for your power piping installation to Pittsburgh Piping and Equipment Company.

It pays because you obtain the advantages of a distinctive engineering technique, specialized manufacturing facilities, broad experience in diversified piping applications, and skill in meeting and solving present-day erection problems.

It pays because you are relieved of a thousand-and-one details . . . and because you are assured of a lastingly reliable and efficient piping system. Ask our nearest representative for further information.

Pittsburgh Piping
AND EQUIPMENT COMPANY
10 Forty-Third Street — Pittsburgh, Penna.

Woolworth Building, New York — Peoples Gas Building, Chicago
Chamber of Commerce Bldg., Indianapolis — Public Square Building, Cleveland
Book Tower, Detroit — 10 High Street, Boston
525 Market Street, San Francisco — Heights State Bank Bldg., Houston
Whitehead Building, Atlanta

NAMES in the News

PERSONALS

REED & TUTTLE ADVANCED BY RHINELANDER COMPANY

As supervisor of fundamental research and new technical development problems, Robert W. Reed has been appointed to the technical staff of the Rhinelander Paper Company, Rhinelander, Wisconsin.

Mr. Reed has come to the company with an extensive background in the paper field. Prior to joining the Rhinelander organization, he was with the Ozalid Division of General Airline and Film Corporation, where he acted in the capacity of paper consultant. Before that time, he was with the Eastman Kodak Company where he was concerned with technical phases in the production of photographic papers, wrapping papers, and board.

Also announced was the appointment of John Tuttle as plant engineer. Mr. Tuttle primarily will be concerned with new mechanical development equipment installations and additions. He was formerly with the Glassine Company of West Conshokocken, Pennsylvania, where he acted in a similar capacity.

▼

GEO. BLACK TO HEAD NEW DEPT. AT COOPER ALLOY

The co-ordination of all advertising, publicity and public relations activity of the Cooper Alloy Foundry Company, Hillside, New Jersey, will be under the direction of George Black, public relations division manager.

Upon completion of his schooling, Mr. Black joined the Inspection Division of the Glenn L. Martin Company, Baltimore, Maryland. During his five years as a foreman in the detail manufacturing section, he combined writing and teaching abilities with technical knowledge. Early in 1947, he joined the Nickel Sales Division of the International Nickel Company,

George Black

where his primary concern was publicity activity relating to nickel steels and irons.

Mr. Black holds active membership in the American Society for Metals, American Electroplaters' Society, the Electrochemical Society and House Magazine Institute.

▼

▶▶▶ Acting as liaison with government agencies, *Alexander Leggin* has been appointed assistant to Dr. Thomas H. Vaughn, vice president in charge of research, Wyandotte Chemicals Corporattion, Wyandotte, Michigan. Mr. Leggin was formerly head of Washington News Bureau of the American Chemical Society. Prior to the war, he held a fellowship at the Mellon Institute of Industrial Research and later was head of a research division of the Pittsburgh Plate Glass Company.

▼

▶▶▶ Assuming his new duties immediately, *Claude M. Haggerty* has been named assistant general manager of Smith Paper, Inc., Lee, Massachusetts. Mr. Haggerty came to Smith Paper in 1919 as a cost accountant. Until recently he has been cost analyst, the duties of which he will continue in his new position.

▶▶▶ *W. Kirk Sutlive,* publicity director of Union Bag and Paper Corporation of Savannah, Georgia, has been elected president of the Associated Industries of Georgia.

▼

▶▶▶ From his territory in North-central Indiana, *John M. Munro,* sales representative of E. C. Atkins and Company, Indianapolis, Indiana, has been transferred to the Cincinnati district. This district was formerly covered by B. L. Ownes, now manager of Atkins' Chicago branch. Before joining the company twelve years ago, Mr. Munro worked for W. O. Barnes Company.

▼

▶▶▶ Arriving in Carthage, New York, recently *Marcel Dardenne,* of Lessmer, Belgium, is to study the machinery and processes used in the paper mills of northern New York. Mr. Dardenne is assistant technical engineer for the DeNaeyer Company in Willebroeck. The Belgian plant is a Taggart Corporation sulphite plant, which manufactures glassine, greaseproof and kraft paper.

▼

▶▶▶ Vice president in charge of sales of the Sorg Paper Company at Middletown, Ohio is the appointment made to *Roy A. Nash.* He succeeds Harry C. Johnson, an associate of the company for forty years. Mr. Nash has been connected with the Marathon Corporation of Rothschild, Wisconsin, since 1924.

▼

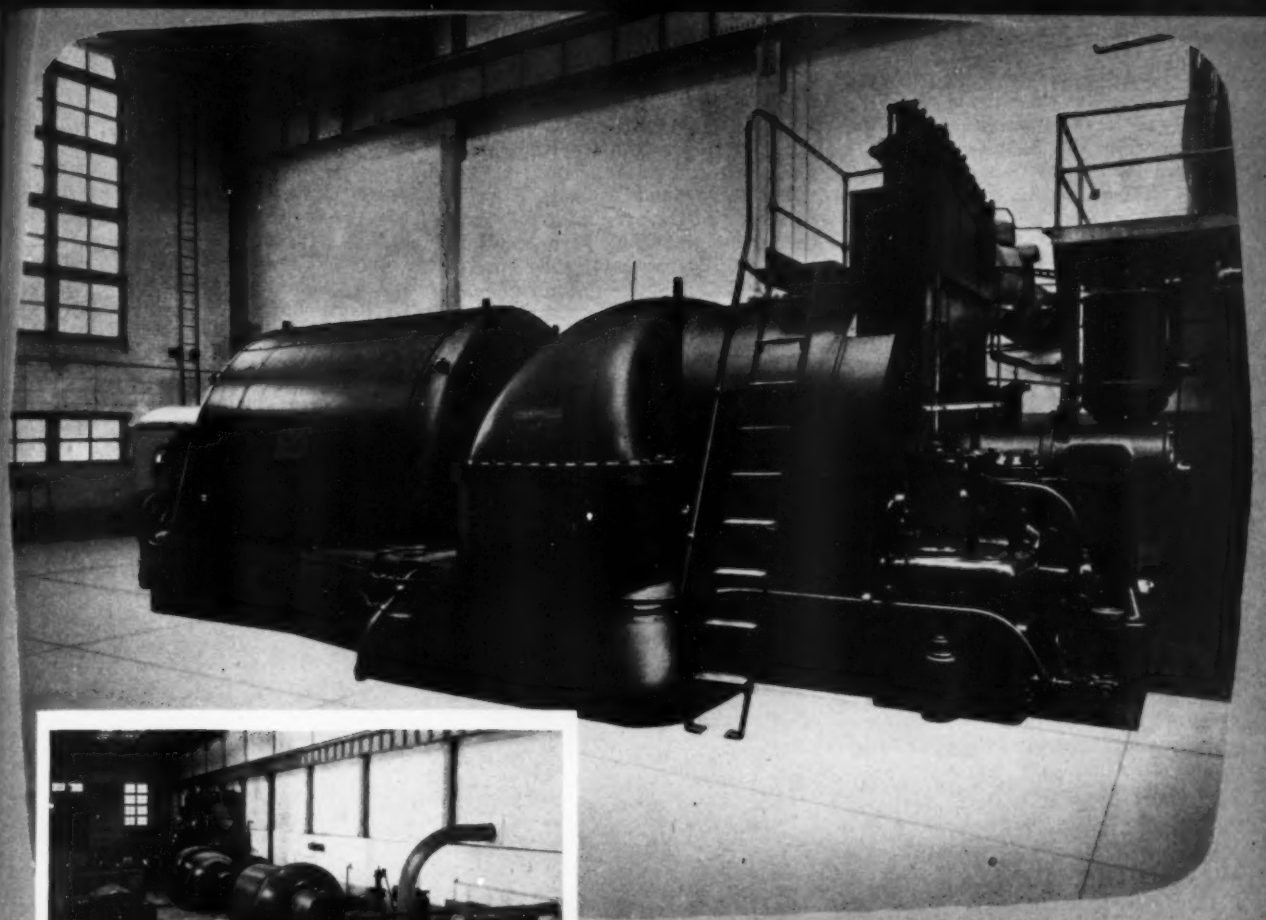
▶▶▶ With broad experience in both the manufacture and sales of stainless, special corrosion, and heat resisting steels, *E. E. Bradberry* has been appointed assistant manager of sales in Chicago by the Jessop Steel Company, Washington, Pennsylvania. He was formerly stainless sales engineer in the Chicago office of Carnegie-Illinois Steel Corporation.

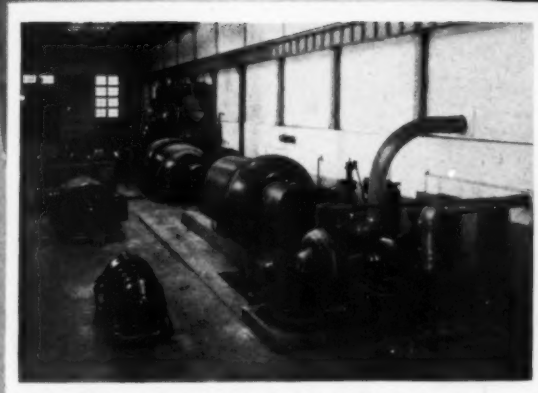
▼

PENNSALT CO. INCREASES CHEMICAL RESEARCH STAFF

The appointment of Hyman Iserson and Maurice E. Miville as research chemists at the Whitemarsh Research Laboratories has been announced by the Pennsylvania Salt Manufacturing Company, Philadelphia, Pennsylvania.

Mr. Iserson received his bachelor of science degree at the College of the City, New York and his master's degree at Temple University. He formerly worked as a research chemist for Frankford Arsenal and Rohm and Haas. He is now a member of the American Chemical Society and the Organic Chemists Club of Philadelphia.





Is your turbine operation this safe?

In 1938, the midwest utility plant shown above put Nonpareil Turbine Oil into a 6,000 KW unit. A year later, a shift to Nonpareil was made on one 10,000 KW turbine and, in 1941, on a second 10,000 KW unit. The original fills of oil have not needed to be removed or replaced in the seven to ten years of operation. The oil has not been treated or rested, yet neutralization numbers have stayed below 0.10. Results: no outage time for oil-system maintenance, no downtime due to acidity troubles. Moreover, these turbines are protected against such outages for the life of each unit.

Nonpareil Turbine Oil will not increase in acidity above 0.15 mg. KOH/gm no matter how long it remains in the turbine. This is guaranteed in writing and is borne out by performance records covering 20 years. Nonpareil assures clean operation because (1) deposit-forming hydrocarbons are removed from the oil by the refining process . . . (2) acidity increase and the formation of sludge are prevented by an oxidation inhibitor in the oil. To clinch safe turbine operation, an anti-foam agent and a corrosion inhibitor are added to Nonpareil.

A Standard Oil Lubrication Engineer will be glad to supply you facts and figures from 20-year service records of Nonpareil Turbine Oil. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

Nonpareil
Turbine Oil

STANDARD OIL COMPANY (INDIANA)

STANDARD

Mr. Miville received his bachelor of science degree in chemistry at the University of New Hampshire and is also a member of the American Chemical Society. He formerly was employed by the Celanese Corporation of America.

▼

WM. POWELL CO. APPOINTS JOE L. COMER VICE PRES.

The appointment of Joe L. Comer as vice president in charge of sales in the New York area has been announced by The Wm. Powell Company, of Cincinnati, Ohio. Mr. Comer will have his headquarters at 50 Church Street, New York City. He is well known throughout the industry, having held the position of vice president of Culbert Pipe and Fittings Company since 1943. Mr. Comer also was for many years engaged in general sales and trade relations with the Crane Company.

Joe L. Comer

▼

▶▶▶ After being associated with the company for the past two years, *Arch G. Hepburn* has been appointed vice president of the Schwarz Paper Company, Chicago, Illinois. Mr. Hepburn handled advertising for the former Tomahawk Kraft Paper Company (now the National Container Corporation), Tomahawk, Wisconsin, and was later moved to the Chicago sales office. He is also active in the Chicago Professional Paper Group and in the Salesmen's Association of the Paper Industry.

▼

▶▶▶ Moving from assistant sales manager, *G. B. Davis* has been promoted by the Baker-Raulang Company, Cleveland, Ohio. This does not involve any change of duties, as Mr. Davis has been in active charge of the sales negotiations for some time. He became associated with the Baker-Raulang Company in 1935, and joined the sales staff of the Baker Industrial Truck Division two years later.

▼

STALEY PERSONNEL CHANGES

Personnel changes, which have taken place in the A. E. Staley Manufacturing Company, Decatur, Illinois, were announced by H. L. Vanderberg, head of the paper mill field sales staff.

Carl Gehring has been transferred from the New York state territory to the Ohio territory, which includes several midwestern states.

Succeeding him in New York state is Gordon White. Mr. White will be an assistant to Ray Kilty, whose northeastern territory includes New York state and New England.

Robert Schwandt, a chemical engineer with the company since 1945, has been transferred to the paper mill sale force. He is representing the company in Wisconsin, Michigan, and Minnesota territories.

James J. Turek, Jr., who has recently joined the paper mill field staff, will work chiefly on the west coast.

▼

BOWSER MAKES ERWIN VICE PRES. AND SALES DIRECTOR

The newly created post of vice president and director of sales of Bowser, Inc., Fort Wayne, Indiana, has been given to Fred S. Ehrman, general sales manager of the company since 1944. The announcement was made by R. Hosken Damon, president, following a meeting of the board of directors.

Fred S. Ehrman

Mr. Ehrman has been associated with Bowser since 1925, and has served successively in experimental engineering, sales engineering and divisional sales work.

▼

▶▶▶ Appointment of *Dr. James R. Donnalley* as manager of General Electric's silicone manufacturing plant at Waterford, New York, has been announced by John L. McMurphy, manager of the Chemicals Division. In November 1943, Mr. Donnalley joined the company in the chemical section of the Research Laboratory, working on fundamental silicone chemistry. In April of 1946, he was transferred to the chemical engineering division of the Chemical Department, taking charge of the Waterford group.

COLUMBIA CHEM. DIV. MAKES RESEARCH STAFF PROMOTIONS

The appointments of Dr. Albert E. Sidwell, Jr. as assistant director of research and Ralph F. Wolf as manager of compounding research for the Columbia Chemical Division has been announced by the Pittsburgh Plate Glass Company, Pittsburgh, Pennsylvania.

Dr. Sidwell will direct the division's laboratory work in inorganic and analytical fields. Prior to joining the Columbia Chemical Division, he had been associated with the American Medical Association for ten years. Previously, he had served four years as a research instructor at the University of Chicago. Dr. Sidwell is a member of the American Chemical Society and former editor of The Chemical Bulletin, Chicago section and currently a member of the society's committee on Professional Relations and Status.

Dr. A. E. Sidwell, Jr. (left) and Ralph F. Wolf

Prior to joining the Columbia research department last January, Mr. Wolf had served for two years as technical director of the Standard Chemical Company, Akron, Ohio. Previously, he had been assistant factory manager for the Polson Rubber Company. During three war years, he served the War Production Board as chief, synthetic rubber allocation section. Prior to the war, he was associated with the Standard Oil Development Company as manager of synthetic rubber compounding research.

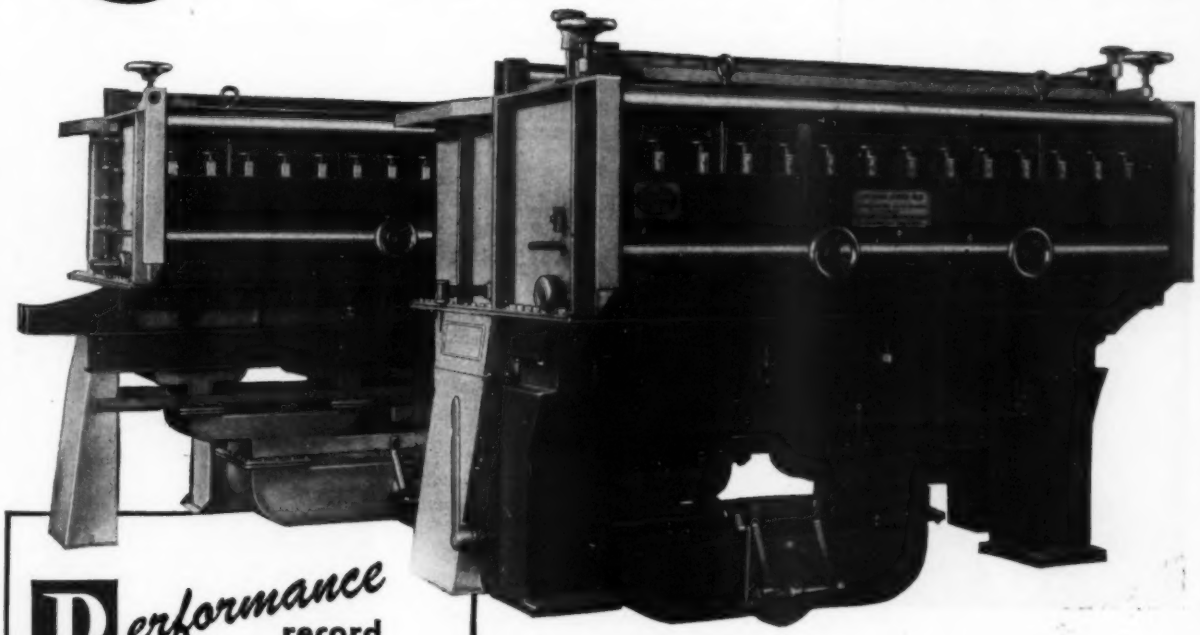
▼

▶▶▶ Resignation of *W. J. Mandley*, electrical engineer, from the Pacific Paperboard Company, Longview, Washington, has been announced. Mr. Mandley has accepted a position with the Long-Bell Lumber Company in Weed, California.

▼

▶▶▶ With the company for the past fifteen years, *Richard F. Amacher* has been appointed eastern sales manager of the Corn Products Department, Annheuser-Busch, Inc., New York City. He succeeds Mr. Flahiff, who has resigned. Mr. Amacher started in the

Uniform pond-to-wire delivery with Sandy Hill flow control units



Performance record

1. Speed stepped up 20%
2. Produces wider sheet in relation to slice width.
3. Makes superior looking sheet
4. Spread under dandy is more uniform
5. Immediately increases use of water in the sheet
6. Good supercalender operation with paper produced at increased speed

THESE Sandy Hill flow control units are widely adaptable. They are adjustable to both high and low slices and equally good results are gained at high or low speed, or when a secondary slice is desirable.

Built into these units are the acclaimed advantages of two Sandy Hill products—the Bertrams Flow Distributor and the Neilson Slice. With these flow control units, paper may be made with the finest of caliper control and fiber distribution.

The slice may be pivot-carried, allowing advancement or retraction. Units come custom built, and are available for use with either deckle straps or ruler edge deckles.

Sandy Hill Iron & Brass Works

Hudson Falls, N. Y.

Machinists and Founders Specializing in Paper and Pulp Mill Machinery.

Manufacturers of
Adjustable Cylinder Vats
Cylinder Paper Machines
Pulp Grinders
Dandy Roll Drives

Pulpers or Kneaders, Voith
Thickeners
Quick Opening Gate Valves
Bertrams Flow Distributors
Bertrams Shakes

Neilson Slice
Feltless Wet Machines
"Selective" and Corner Drives
Fourdrinier Paper Machines
"Packer" Screens

Castings
Bleaching Equipment
Scofield Felt Conditioners
Cleveland Type Bearings
Shaker Screens

St. Louis home offices of the company and worked his way up through the ranks. He has broad knowledge and experience in the industries the company serves with corn syrups, starches, and dextrines.

▼

DR. KERN JOINS PROCESS ENGINEERING DIV. OF THE PATTERSON FDRY. & MCH. CO.

Joining the Process Engineering Division of the Patterson Foundry and Machine Company, New York City, Donald Q. Kern has been appointed director of engineering of that division. He will direct an expanding program in the design of processes and plant for the petroleum, heavy chemicals, synthetic and petrochemical fields.

Dr. Donald Q. Kern

Dr. Kern resigned last year from the Foster Wheeler Corporation after a long term of employment and has since completed a book on process heat transfer. He has been associated with the graduate school of the Polytechnic Institute of Brooklyn for the last six years.

▼

▶▶▶ Executive assistant *E. C. Schmidt*, Union Pacific Railroad, Omaha, Nebraska, retired on December 1. Mr. Schmidt joined Union Pacific at Los Angeles in 1927, and came to Omaha in 1929 as system director of the railroad's news bureau. He was appointed assistant to president in charge of public relations in 1936, and executive assistant to the president in 1944.

▼

▶▶▶ With headquarters in Rochester, New York, *Richard C. Lawton* has been appointed district engineer in the territory of Western New York State representing the Bearings Division of the Torrington Company of Torrington, Connecticut. *J. H. Williams* is now assisting L. A. Toth in the Dallas office of Torrington as district engineer. *J. N. Wholean* has augmented the Milwaukee staff, representing the Bearings Division as district engineer.

▼

▶▶▶ The appointment of *William J. Hall* as production manager of the Ivanhoe Division of the Reliance Electric & Engineering Company, Cleveland, Ohio, was announced by the division manager. Mr. Hall first joined Reliance back in 1935 as a dispatcher in the production department. He has been night superintendent of the Ivanhoe Division for the past two years.

▼

FRENCH PAPER MILL DESIGNER OBSERVING TECHNIQUE AT SHARTLE

Since the latter part of October, James H. Dutruc, of the French mill, Papeteries J. B. Weibel, has been in Middletown, Ohio, where he expects to remain for 8 to 10 months as an observer at the plant of Shartle Bros. Machine Company.

Before coming to Middletown, Mr. Dutruc set up a sulphite pulp laboratory at the Weibel Company where he has served as designer. His father is technical director of that mill.

▼

▶▶▶ With a broad knowledge of corporate affairs, *George W. Warren* has been elected a director of Rayonier Incorporated, New York City. Mr. Warren is also a director of a number of well-known companies, including Remington Rand, Incorporated, Virginia-Carolina Chemical Company, Wallace & Tiernan Corporation, and Home Title Insurance Company.

▼

▶▶▶ Divisional manager of the New York plants of United Board and Carton Corporation, *C. A. Mulqueeny*, has been elected president of the Courtney Folding Box Corporation, Brooklyn, a wholly owned subsidiary of United Board and Carton. He will maintain an office at 285 Madison Avenue, New York City, as well as at Victory Mills.

▼

McCREADY ADDED TO SALES FORCE OF NOPCO CHEMICAL

Effective January 1, William A. McCready will become a member of the central area sales force for the Industrial Division of Nopco Chemical Company.

Prior to this appointment, Mr. McCready spent several years in the company's laboratories at Harrison, New Jersey, specializing in product application and customer service problems.

Mr. McCready's sales territory will include Indiana and sections of Ohio and Kentucky where he will work directly under John N. Gammon, district manager. In addition to sales on the processing chemical line of Nopco, he will handle the metallic soap products of Metasap Chemical, a subsidiary company.

▼

▶▶▶ With headquarters in Longview, Washington, *J. P. Foley*, new manager of Silvacon Sales, will assume merchandising responsibility and will direct further introduction of the new materials to domestic manufacturers and processors. Sales and technical servicing of Silvacon have previously been handled through Weyerhaeuser Timber Company and their development department at Longview, Washington.

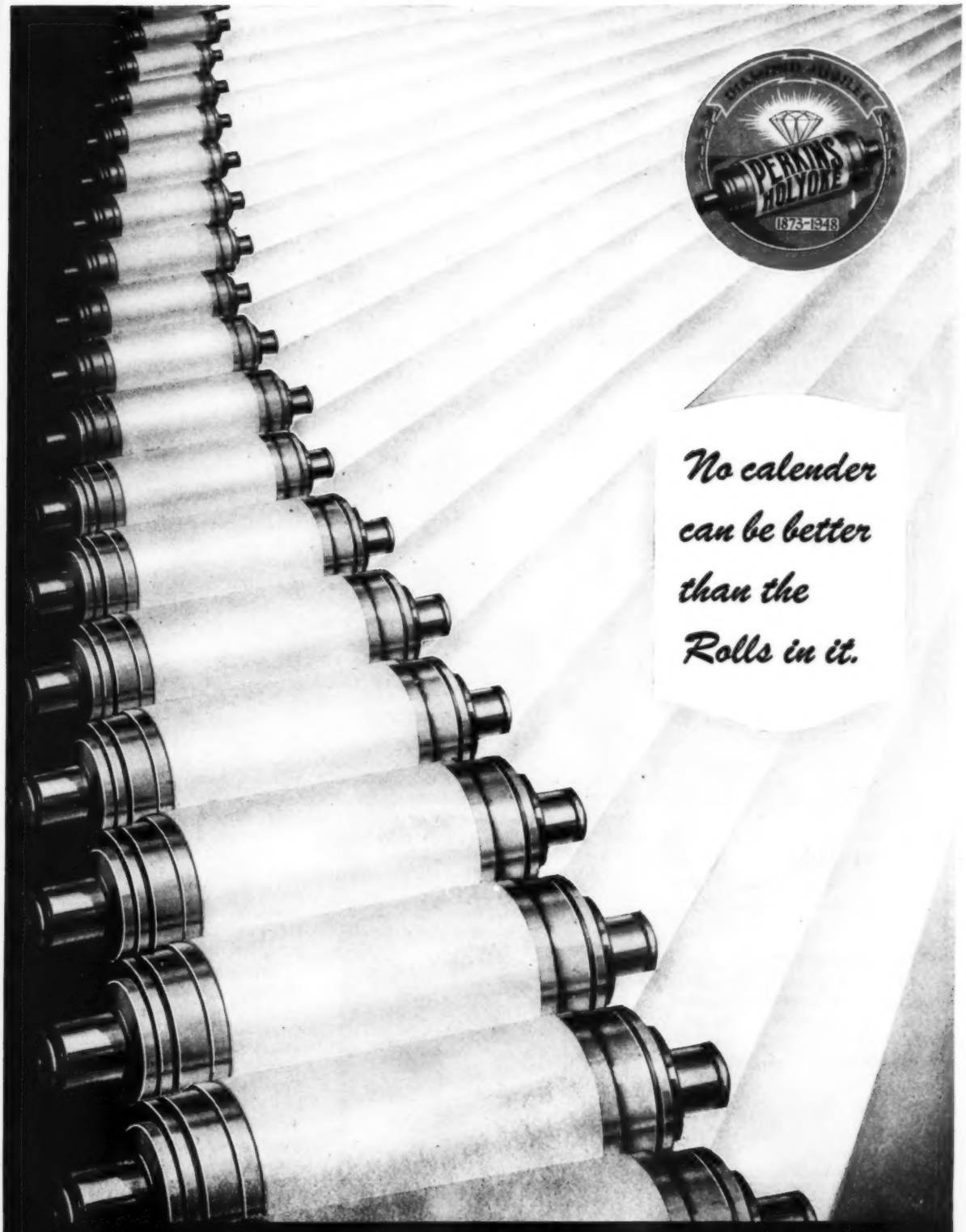
J. P. Foley

▼

SOME PERSONNEL CHANGES ANNOUNCED BY HERCULES

To work on process development, Dr. Peter Van Wyck has been appointed technical assistant to director of research of the Hercules Powder Company, Wilmington, Delaware. He was former manager of the Virginia Cellulose Division of the Hercules Powder Company Experiment Station.

Dr. Richard E. Chaddock, who has been handling technical assistance in the process development field, now will take over responsibility for technical assistance on sales development. Dr. Arthur F. Martin will replace Dr.



B. F. PERKINS & SON, Inc.

HOLYOKE, MASS., U.S.A.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

Van Wyck as manager of the Experiment Station. E. J. Jones, operating supervisor at the Hopewell plant, succeeds Dr. Martin as chief chemist of that plant.

Dr. Van Wyck joined Hercules in 1930 as a research chemist at the New Jersey plant, transferring in 1939 to the Hopewell, Virginia, plant as chief chemist. In 1945, he moved to the Experiment Station to head the Virginia Cellulose Division.

As a technical assistant in the Research Department, Dr. Chaddock joined Hercules in 1945.

Dr. Martin joined Hercules in 1941 at the Experiment Station, remaining there as a member of the general research staff until 1942. He then transferred to Hopewell to work in the research laboratories.

Immediately after his graduation from William & Mary College, Mr. Jones joined the Hercules Company in 1939.

▼

▶▶▶ For the forthcoming year, *H. M. Hooker,* chairman of the board, Hooker Electrochemical Company, Niagra Falls, New York, was re-elected a board member of the National Industrial Conference Board. Mr. Hooker was first elected a board member in 1938, and has been active in the work of the Conference Board. The Board, founded in 1916, is an independent and nonprofit institution for research and education in the fields of economics and business.

▼

OLIVER PORTER HAS LEAVE—TO DO SPECIAL WORK WITH NAT'L SECURITY BOARD

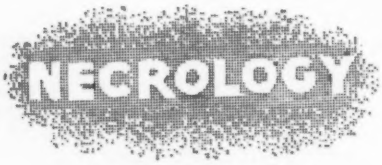
A leave of absence has been granted to Oliver Porter, executive director of the United States Pulp Producers Association.

Mr. Porter will be away from his post for about four months, during which time he will head up the Pulp and Paper Section of the Forest Products Division of the National Security Resources Board in Washington, D.C.

▼

▶▶▶ Former general manager of sales, *Frank B. Rackley* has been made vice president in charge of sales by the Jessop Steel Company, Washington, Pennsylvania. Before joining the Company, Mr. Rackley was in charge of stainless steel sales at the Chicago office of the Carnegie-Illinois Steel Corporation. *Curtis A. Gordon,* general works manager has been made vice president in charge of operations. He was formerly superintendent at the Colorado Fuel and Iron Corporation, Wickwire Spencer Steel Division.

▶▶▶ A tribute to *Dr. R. S. Hatch* of Longview, Washington, was made recently at the Pacific Section of TAPPI meeting, held in Camas, Washington. Attention was called to his findings in the field of research and his important work in the pulp and paper industry. Dr. Hatch was formerly research director for the Weyerhaeuser Timber Company's pulp division; he is a past president of the Technical Association of the Pulp and Paper Industry.



RICHARD J. CULLEN

In Phoenix, Arizona, Richard J. Cullen, chairman of the corporation of International Paper Company, New York City, passed away November 13, 1948. He was 76 years of age, and had resided in Phoenix since 1940. He also spent the winters there a number of years previously.

Mr. Cullen was born in Canada. As a young mechanical engineer he was employed in the Engineering Department of the Riordon Paper Mills, Limited, the properties of which are now part of Canadian International Paper Company. In 1909 he came to the United States as manager of the Cushnoc Paper Company, Augusta, Maine.

Some years later, Mr. Cullen became interested in the possibility of manufacturing kraft pulp and paper in the Southern states. The first kraft paper mill in the South had been built at Orange, Texas, in 1910, but the important development in kraft paper did not come until the 1920's.

Richard J. Cullen

In 1918, Mr. Cullen became vice president and general manager of the Louisiana Fibreboard Company of Bogalusa; the mill was remodled and later sold to the Great Southern Lumber Company.

He designed the plant of the Century Roofing Company of New Orleans and later negotiated a consolidation of this company with the Richardson Paper Company of Lockland, Ohio.

In 1920, Mr. Cullen designed and built the Bastrop Pulp and Paper Company mill at Bastrop, Louisiana, for the manufacture of kraft pulp and paper. As soon as this mill began operating, he designed and built the Louisiana Pulp and Paper Company mill, also in Bastrop.

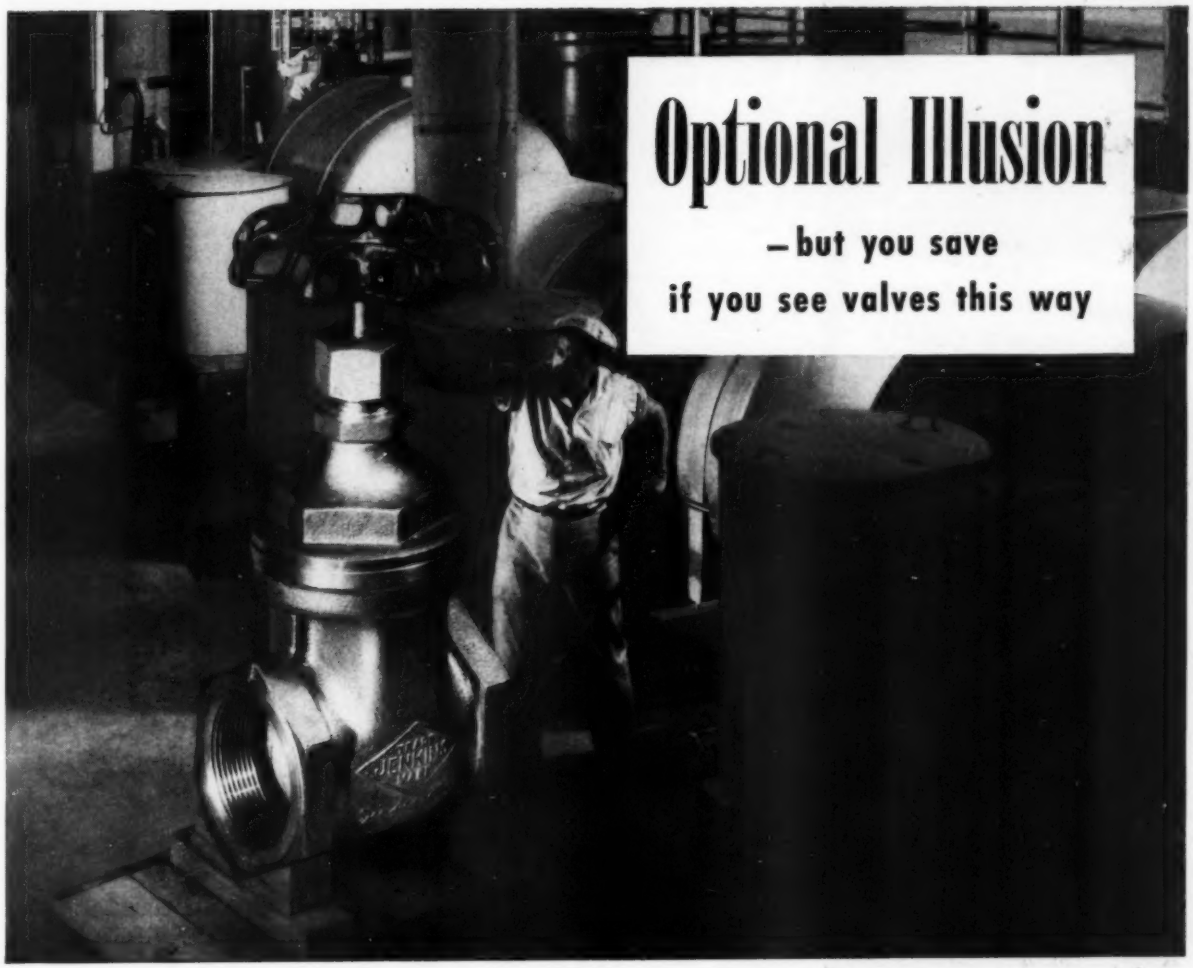
Bastrop and Louisiana Mills operated independently until 1925, when International Paper Company purchased the Bastrop Mill. Two years later International acquired the Louisiana Pulp and Paper Company Mill, and at that time Mr. Cullen joined the International family as president of Southern International Paper Company. Later he became president of its successor, Southern Kraft Corporation. He was elected vice president of International Paper in 1927 and continued in direct charge of Southern Kraft operations until 1935, when he was appointed manager of manufacture of all International Paper Company's mills.

In 1927, under Mr. Cullen's direction, the company began construction of the mill at Camden, Arkansas, the first Southern Kraft Mill built by International, which was completed early in 1928. Also, in 1928, the Moss Point, Mississippi, mill, originally constructed in 1912, was acquired and remodelled by the Company. In 1929, under Mr. Cullen's supervision, the company built the Mobile, Alabama, mill which began production of various grades of kraft paper the same year.

During the late 1920's Mr. Cullen had become interested in the vast possibilities of mass-producing an all-kraft board for shipping containers on fourdrinier paper machines, and in March, 1931, International's Panama City, Florida, mill, built during 1929 and 1930, started operations. The Panama City mill, designed by Mr. Cullen, was the first kraft mill to be devoted exclusively to container board production.

In 1937, the company built another large container board mill at Georgetown, South Carolina. In 1942 it was enlarged to become the largest paper mill in the world. In 1938, the company completed construction of the Springhill, Louisiana mill.

Mr. Cullen became a director of International Paper Company in Jan-



THERE ARE TWO WAYS of regarding the valves in your plant. You can think of the relatively small cost of a single valve, and dismiss them as a minor, "petty cash" investment. Or, you can think of *all* valves in your plant as *one* valve, as pictured, by photo-magic, in this pharmaceutical plant, — and see them in proper perspective.

YOU'LL FIND IT PAYS to take the latter view, for in *any* plant, *any* building where fluid control is involved, valves, collectively, are as important, in terms of investment and operating expense, as larger plant units, and should be selected with the same sharp eye to quality and economy.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but multiplied by thousands, it is a serious drain on operating budgets. JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, or maintenance.

For all new installations, for all replacements, rely on Jenkins quality and engineering for lowest valve costs in the long run. *Sold through leading Industrial Distributors.*

•

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Ltd., Montreal.

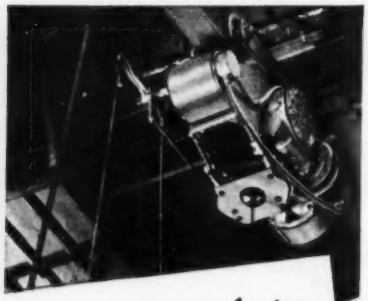
"PRACTICAL PIPING LAYOUTS" is a 32-page book containing diagrams and descriptions of 25 basic piping layouts with complete recommendations for valve selection and location in the lines. Tells you "which valve where for best performance". FREE on request. Write JENKINS BROS., 80 White Street, New York 13, N. Y.

LOOK FOR THIS JENKINS DIAMOND MARK

SINCE 1864

JENKINS VALVES

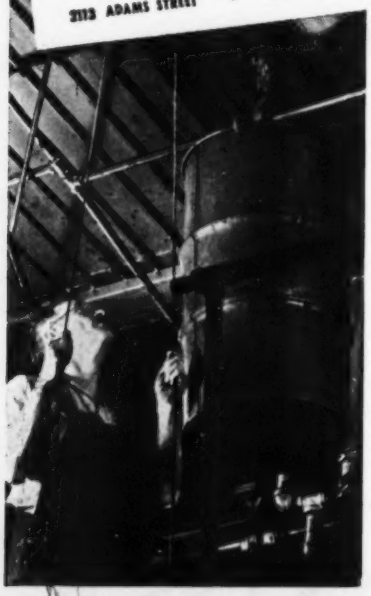
Types, Sizes, Pressures, Metals for Every Need



Modern Hoist Logic:
3-2 = LOWER COSTS!

—Yes, rock-bottom handling costs—*and* more output per hour! Here's the record: Heavy drums of chemicals had to be lifted to a raised vat—and lifted fast. The block and tackle formerly used required 3 men to get the proper lift speed. This ½-ton Reading Electric Hoist paid for itself in 2 months by keeping 2 men on their regular jobs and letting the third raise drums alone—in half the previous time! Let a Reading engineer help you get the same kind of handling results with a fast, smooth-working Reading Electric Hoist. Drop us a line today for full details. No obligation, of course.

READING CHAIN & BLOCK CORP.
2113 ADAMS STREET • READING, PA.



READING HOISTS

uary, 1936, and a few weeks later was elected president of the company. In 1943, he was elected chairman of the corporation and was succeeded as president by John H. Hinman.

▼

WILLIAM E. NASH

Former sales manager of Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, William E. Nash, passed away at his home October 19. He was 67 years of age.

Associated with Nekoosa-Edwards for over 30 years, Mr. Nash had been in retirement since 1930 when he was compelled to retire from active business life. He was a life-long resident of Wisconsin Rapids.

▼

DR. FRED G. COTTRELL

Nationally known chemist and financial backer of scientific research, Dr. Fred G. Cottrell, 71, passed away in Berkeley, California, November 16. He established the Research Corporation of America in New York, which annually finances research for 200 scientists. The money comes from profits from an invention of Dr. Cottrell to control smoke particles and poisonous gases from industrial plants.

Dr. Cottrell had been director of the United States Bureau of Mines, and in 1933 was chief consultant chemist for the Tennessee Valley Authority. He was president of Research Association, Inc., in 1935-1938, and served as technical consultant to that group and the Smithsonian Institute.

▼

▶▶▶ A member of the engineering staff of the New Brunswick International Paper Company at Dalhousie, *Fred Parsons,* passed away suddenly at the age of 52. Before coming to Dalhousie about a year ago, he was on the engineering staff of the company's Three Rivers mill.

▼

GEORGE H. HARVEY

Widely known throughout the industry, George H. Harvey, a pioneer among paper manufacturers, passed away suddenly in Middletown, Ohio, October 31, 1948. He was 82 years of age.

Mr. Harvey was one of the founders of the company that became the Gardner-Richardson Company. He was born in England and was brought to this country when only a small boy. His first papermaking experience was in Canada where he was associated with several companies. In 1896, he came to Middletown, Ohio, at the request of Colin Gardner, Sr., and became associated with him in the old Tytus-Gardner Paper and Manufacturing Company. With the elder Mr. Gardner, and his son, E. T. Gardner, Mr. Harvey formed a company in 1900 that was known as the Colin Gardner Paper Company. From this company grew the present Gardner-Richardson Company.

For many years Mr. Harvey was a member of both the Technical Association of the Pulp and Paper Industry and the American Pulp and Paper Mill Superintendents Association.

Surviving are the widow and one son, Arthur R. Harvey.

▼

▶▶▶ A prominent figure in the paper industry for many years, *David F. Hayes,* 70, passed away in Rochester, New York, October 25. Mr. Hayes was affiliated with the Lawless Paper Mills for more than 35 years. He served successively as superintendent of Lawless Mills in Penfield, Scottsville, and East Rochester. He was also a member of the American Pulp and Paper Mill Superintendents Association.

▼

J. WILLIAM JAY

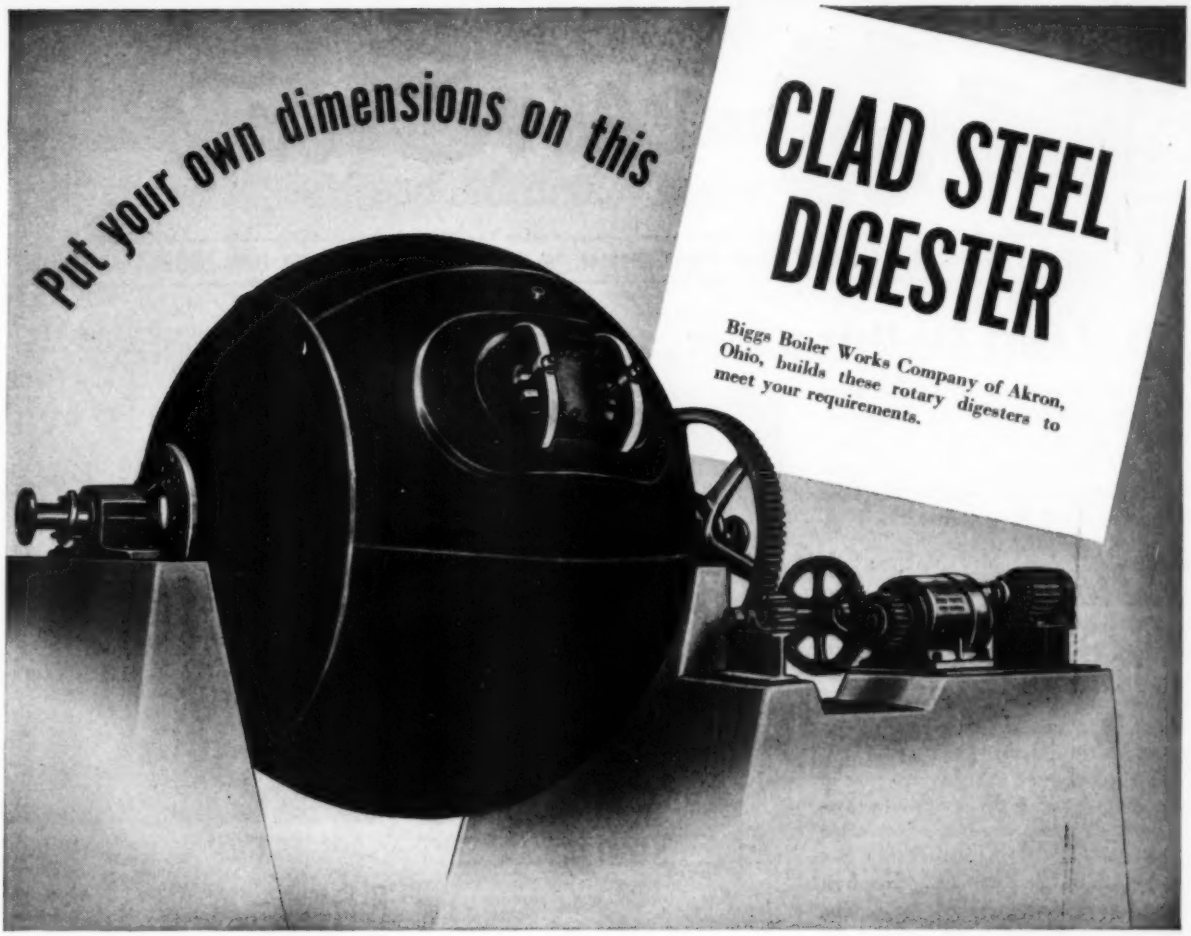
Advertising manager for the last 15 years, J. William Jay, of Henry Disston & Sons, Inc., Philadelphia, Pennsylvania, passed away at his home October 29. He was 63 years of age.

Upon graduation from a business school in South Bend, Indiana, Mr. Jay entered the advertising department of Dodge Manufacturing Company, Mishawaka, Indiana, and later joined the advertising staff of the South Bend Watch Company, South Bend, Indiana. His next job was advertising manager of Rumely Manufacturing Company, makers of farm machinery in LaPorte, Indiana. About seven years later he joined the Smith Advertising Agency, Washington, D. C., as account executive and copy writer.

In 1918, he joined the Eugene McGuckin organization, remaining until it suspended operations. He joined the Disston company as assistant advertising manager in April, 1933, after an interlude of freelancing and selling lithography and photo-engraving. In October, 1933, he became advertising manager.

▼

▶▶▶ Manufacturer of corrugated paper, *Frederick A. Norris,* 76 years of age, passed away November 23 in Cocoanut Grove, Florida. He retired in 1928 as vice president of the Thompson & Norris Company of Brooklyn, New York, and in 1930 as president of the Emerson & Norris Company of Boston, Massachusetts.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CLAD STEEL DIGESTER
Biggs Boiler Works Company of Akron, Ohio, builds these rotary digesters to meet your requirements.

Biggs makes them 3 feet to 14 feet

Made of 1⅛" Lukens 20% Stainless-Clad Steel, this 10-foot, all-welded rotary digester is ASME Code tested to operate at 300 psi. Other Biggs digesters are made of Lukens Nickel-Clad Steel to meet different corrosive conditions.

Your equipment can similarly employ Lukens Clad Steels to lengthen its life and safeguard your products—Nickel-Clad, Stainless-Clad, Inconel-Clad or Monel-Clad, according to the materials to be handled. Cladding 10% or 20% of total plate thickness suits most requirements, giving you *solid* corrosion-resistant metal protection at the lower cost of clad steels.

The extra smooth sodium hydride finish, now available with Lukens Clad Steels, makes equipment even easier to keep clean and minimizes sliming.

Lukens offers the widest range of clad steels available from any source—a uniform cladding permanently bonded to a steel backing plate, in widths up to 178 inches or over 3 inches thick. Bulletins 255 and 338 describe these clad steels. For copies, write Lukens Steel Company, 408 Lukens Building, Coatesville, Pennsylvania.

LUKENS
Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

R-S valvEvents

ISSUED PERIODICALLY BY R-S PRODUCTS CORPORATION, PHILADELPHIA 44, PA., FOR THOSE CONCERNED WITH FLOW CONTROL AND SHUT-OFF

Lots of Folks Can Make a Valve . . . .

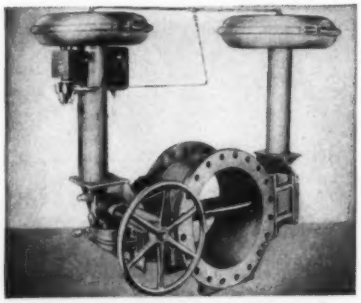
Many machinists can make a valve. They don't even have to be very good machinists, nor have very good equipment because it probably won't be a very good valve anyway. In any event it will lack the engineering a valve requires if it is to stand up and deliver the service.

Big businesses with big shops often succeed in building a valve which will give service but they pay a fabulous price to do it, though the cost is often hidden in "shop overhead." Various people concerned believe they have saved money but accurate cost-accounting would prove this not to be the case.

We recently saw a large valve built in the company shop by a manufacturer (not in the valve business) who boasted of a cost of only about $4,000. We couldn't have built the job in our own shop, specializing in valve construction, for less than $7,000, before figuring our modest profit. We know darned well no amateur valve-builder could build it for $4,000 either!

The days of the slap-happy stove-pipe damper masquerading as a valve are gone, and R-S Products with its rigid engineering standards has done much to banish them.

R-S Control and Shut-off Valves are as carefully engineered as a bridge or a building and there are just about as many stresses to figure to build a valve which will give full service with full safety factor, without waste of material or labor.



R-S Valve Type 706, 24 inch, 125 pound, with two diaphragm motors

For Regulating Downstream Pressure

R-S Valve, Type No. 706, shown at top of next column, is a 24-inch 125-pound valve with two diaphragm motors, single valve-positioner and single pressure controller. Designed for regulation of downstream pressure. The vane opens with air failure. 80-pound pressure-drop across the valve demands the use of two diaphragm tops to get the needed power.

Let's Get This Straight

Cast iron valves do not thrive in a temperature of 1400° F. Nevertheless, people ask for them occasionally. Russell Ayers, Sales Manager of R-S Valve Division, had another such inquiry recently, as reported to the Editor of ValvEvents.

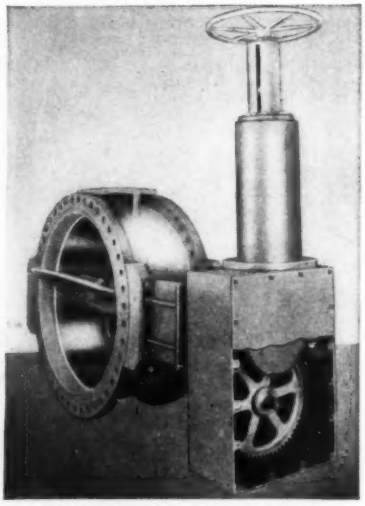
At 1400° F. a cast iron valve has long since lost all interest in flow control, not to mention shut-off.

Here's a brief rough guide on what various metals will take in the way of temperature:

Material	Elevated Temperature Limit
Cast Iron	450 deg. F.
R-S "H" Metal	1000 deg. F.
Carbon Steel	750 deg. F.
Carbon Moly Steel (½% Moly)	950 deg. F.
Chrome Moly Steel (4-6% Chrome ½% Moly)	1250 deg. F.
18-8 Stainless Steel	950 deg. F.
Chrome Nickel Alloy Steel (other than 18-8)	1250 deg. F. up to 2000 deg. F.

There are other factors just as important in the design of a valve as temperature. Therefore, we say the above is only a rough guide.

It is a good idea in addressing inquiries to us on valves to follow the list of working conditions on the inside back cover of R-S Catalog #17. If you haven't one, you'd better tell us and we'll send it.



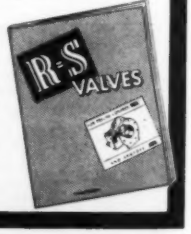
R-S Valve Type 710, 48 inch, 125 pound, with renewable bronze liner

R-S Valve in High Head Water Service

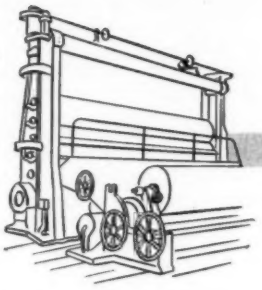
Picture shows R-S Type No. 710. It is a 48-inch 125-pound cast iron valve with renewable bronze liner. This valve was built for water service and is now operating in a western dam under high pressure. The handwheel control has a gear reduction drive so that only 50 pounds of force is required of the operator to handle the valve even under highest pressure conditions.

The New R-S Valve Catalog #17

R-S Valve Catalog #17 is packed with information for engineers. There are over 70 halftone pictures of R-S Valves . . . working drawings of 21 types of R-S Valves with standard controls and fittings and complete dimensional data for all sizes . . . working drawings of 22 types of prime movers . . . numerous other diagrams, graphs and miscellaneous drawings. Address R-S Products Corporation, Valve Division, Philadelphia 44, Pa.

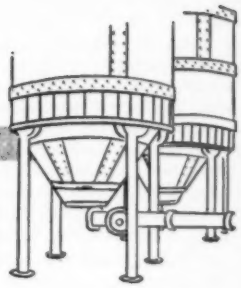


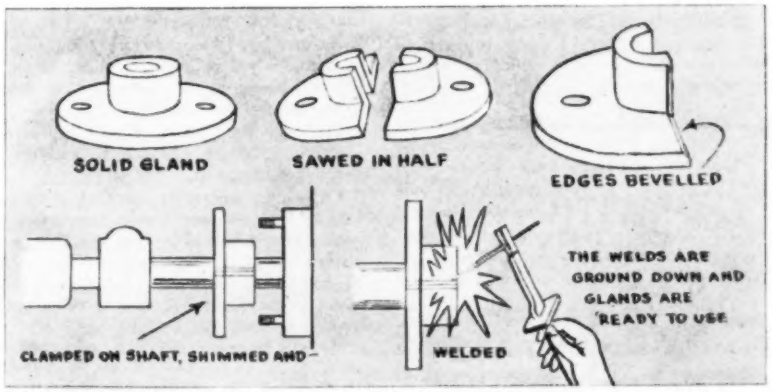
JMLco 41



Practical SHORTS

Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.




SOLID GLAND
SAWED IN HALF
EDGES BEVELLED
CLAMPED ON SHAFT, SHIMMED AND—
WELDED
THE WELDS ARE GROUND DOWN AND GLANDS ARE READY TO USE

Ingenuity Will Out

Al Boyers, of the Stone Container, Franklin, Ohio, had a problem of placing a packing gland that could not be of the regular split type in a location where it meant the removal of a large pulley in order to get the gland in place.

The gland as it came to him was of brass, solid.

He just sawed the gland in half, beveled the edges slightly, put it on the shaft, electric-welded it, and ground up the joint. Result—a perfect job and done in a few hours against probably a 3-day shutdown, had he been forced to remove the pulley.—*The Messenger*, published by THE BLACK-CLAWSON COMPANY.

▼

Circulation of Water in Steam Boilers

Has it ever occurred to you that in some of the tubes of water tube boilers the circulation is "downward" even though the temperature of the water in the tube may be higher at the "top" than it is at the bottom? According to the law of physics, the natural circulation is upward because the weight of the water is the thing that determines the direction of circulation. Hot water has a tendency to move upward through the cooler water which is heavier. Cold water has a tendency to move downward if the water below is warmer and therefore lighter in weight.

Figure 1 shows a common design of horizontal water tube boiler. Arrows in the tubes indicate the usual direction of circulation, the length of the arrow indicating the intensity of circulation, or, velocity. It will be noted that in the third tube from the top the velocity is just about zero—being only slightly upward. The reason for this is that the lower three rows of tubes generate nearly all of the steam. The upper rows are not heated as hot, consequently, there is less difference in temperature and the flow in the upper tubes has a tendency to equalize the more rapid flow in the lower and hotter tubes. There must be circulation at all times, otherwise "dry spots" will occur, and dry spots are dangerous in an intensely hot boiler furnace.

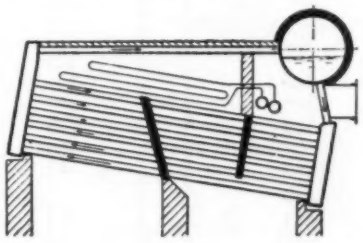


Figure 1

It may be that you have seen diagrams similar to Figure 1 before, but have you ever seen a diagram similar to Figure 2 which indicates the circulation in a fire tube boiler? It was made by an engineer friend of this writer who has had many years of experience with boiler problems. It is claimed by some engineers that circulation in fire tube boilers is "haphazard," but, according to Figure 2 it is not haphazard. Doesn't it seem quite logical that the circulation would be precisely as indicated—upward through the water surrounding the tubes in the central portion of the boiler and downward at the sides close to the boiler shell where the heat is less intense?

An interesting thing to think about in connection with Figure 2 is the "sum" of the lengths of the arrows. Thus, if the arrow length indicates the velocity of the water at the given point, the total of all arrows pointing upward, minus the amount of water generated into steam and carried away from the steam space, would give us

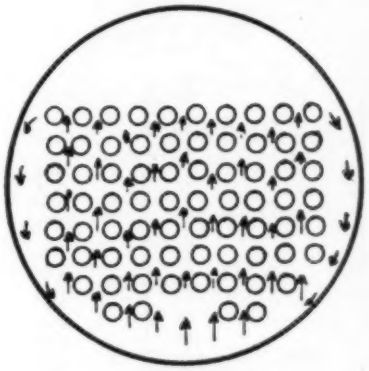


Figure 2

as a result the sum of all the arrows moving downward. The same would be true, also, of Figure 1. Of course the point at which boiler feed water is admitted must be given consideration. Immediately upon being pumped into a boiler the feedwater begins circulating. Written in the form of a formula we have this:

$$D+S=U$$

where

D = pounds of water moving downward per hour;

S = pounds of water generated into steam per hour;

U = pounds of water moving upward per hour.

—W. F. SCHAPHORST, M.E.

▼

The Meaning of "Most Elastic"

We commonly hear the expression "most elastic," but it was only recently that this author was asked to explain its meaning. Thus for example it is sometimes applied to power transmission belting, in which instance it means that the most elastic belting material will return to its original length and shape more perfectly than will any other belting material. It does not mean

that the material will elongate more than other belting materials.

Glass, for example, is one of the most elastic materials in existence, yet most people regard glass as being inelastic. A pane of glass has been loaded down at its center with a weight, in a sprung position, and has been kept in that position for several years. Upon removal of the weight the glass resumed its original shape in spite of the long period of time it had been distorted. That is the best test for elasticity.

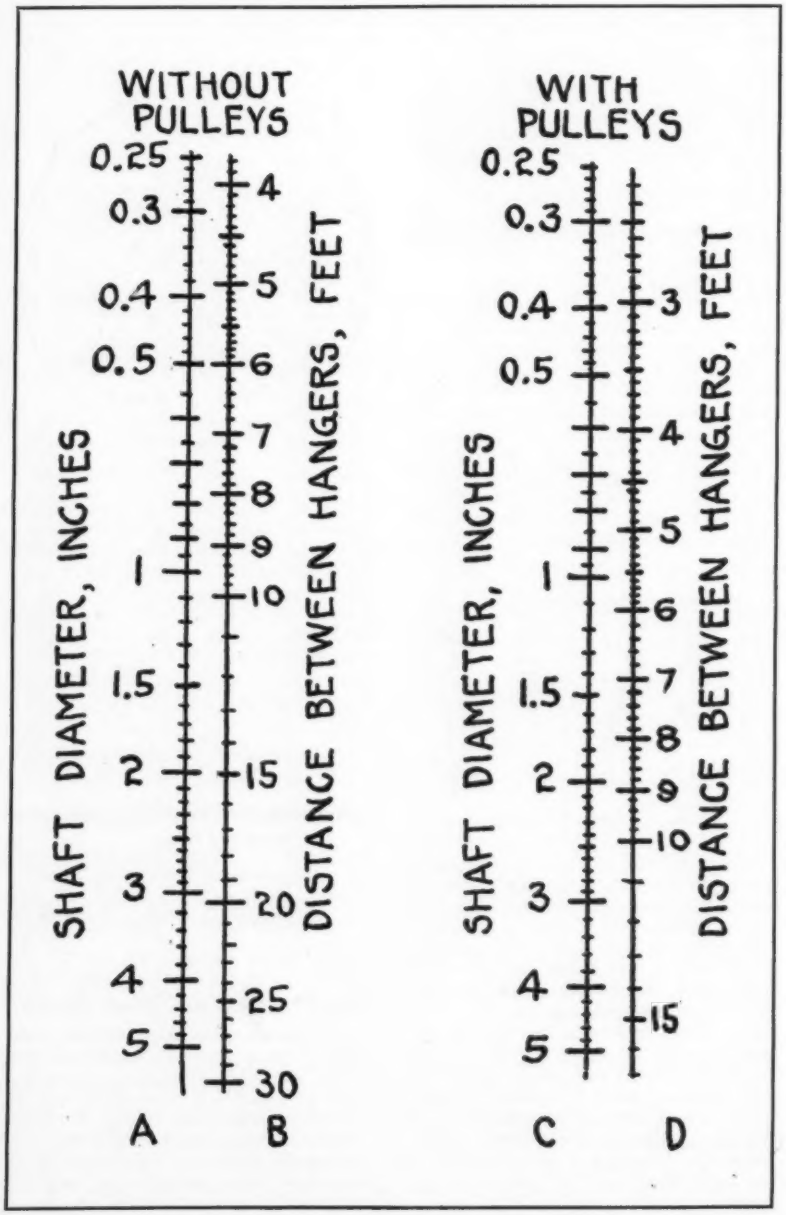
Similiarly, cork is a highly elastic wood, and that is the reason why it is used for corking bottles. When other woods are used as bottle stoppers they come out easily after the passing of time because they don't remain tight. Highly elastic cork maintains its pressure against the sides of the bottle neck, hence doesn't loosen, and doesn't leak. India rubber is "more elastic" than synthetic rubber, so this author has found, particularly when made into elastic rubber bands. The permanent stretch in synthetic bands is much more pronounced than in India rubber.—W. F. SCHAPHORST, M. E.

▼

How to Space Shaft Hangers

Despite the rumors we hear every so often that belting and shaftings are "extinct," the fact remains that shafting is still being manufactured in large quantities, and so is belting, and both products are still being purchased by users. The same is true of shaft hangers, and questions continue to come in regarding the proper spacing of hangers.

In the "old days" the spacing of hangers was largely a matter of guess work. But today, guess work is being rapidly eliminated by the science of engineering. So when the up-to-date buyer wants to hang some shafting he first measures the diameter of the shafting carefully, notes the number of pulleys to be carried, where the pulleys are to be placed, and then consults his installation handbook.



To assist readers who may have shafting jobs to do in the future here are two charts. The chart on the left is for shafting without pulleys as stated at the top. And the other chart is for shafting with pulleys.

To use the chart, let us take this example: How far apart should hangers be spaced on a 2-inch shafting, on which there will be no pulleys?

Find the 2 (column A) and glance across to column B and there is the answer—practically 15 feet apart.

Again: How far apart should the hangers be spaced where an average number of pulleys will be employed, properly spaced close to the hangers?

Find the 2 in column C this time and glance across to column D. The answer is —about 9 feet apart.

Of course, where the shafting is to be heavily loaded—more heavily than average —the distance should be even less than given in Column D. That is where the buyer or installation man must apply directions given in installation handbook, or, mighty good judgment.

As will be noted, the charts take care of shaft diameters from one-fourth of an inch to 5 inches. In practice we seldom have shafts that are smaller or larger than those limits.—W. F. SCHAPHORST, M. E.

▼

Check List for the Occasional Solvent User

Accident records suggest that trouble with solvents arises more frequently where these chemicals are used only occasionally or in comparatively small quantities than where large quantities of solvent are regularly employed. The reason seems to be unfamiliarity on the part of the small user with the need for precautions or with the measures which should be taken.

Because even a single instance of careless or improper handling of a solvent during operations such as cleaning, degreasing or thinning may under certain circumstances result in a fire or sickness, or both, depending upon the solvent used, the following points should be checked:

1. What does the label say?

Many solvent containers are labeled with recommendations for safe use. If the label has no such information, the manufacturer or packager may be of assistance in providing safe handling data. When smaller cans or bottles are filled in the shop from larger containers, the smaller containers should also be clearly labeled.

2. Are solvent containers always kept closed?

Self-closing safety cans are useful when containers must be opened frequently. Open pails are unsafe for storing or carrying solvents.

3. Is there plenty of ventilation whenever a solvent is used?

Any solvent operation, unless it is carried out in entirely enclosed equipment, may give off dangerous quantities of vapor. Depending upon the operation, open windows,

mechanical ventilation or gas masks may be the best way to protect workers from inhaling the vapor. Where a solvent is used frequently, even in small quantities, mechanical ventilation is probably essential. Industrial hygiene services of local and state health or labor departments are glad to advise on ventilation.

4. Is there a noticeable odor of solvent in the workroom?

The absence of solvent odor does not always indicate that the air is safe. However, a noticeable odor generally means that there is too much vapor in the air, even for fairly short operations.

5. Are workers' hands being soaked in solvent?

Whenever solvent may wet the skin frequently or for considerable periods of time, protective gloves of a solvent-resistant material should be worn to prevent dermatitis.

6. Are workers trained to be good "housekeepers"?

Solvents should be handled to avoid spilling, and solvent-soaked waste and rags should be disposed of in airtight containers.

7. Are solvent operations well supervised?

The plant manager or owner must often be his own safety director, to make certain that workers handle the solvent according to instructions and use gloves, gas masks or other safety equipment provided.

8. Are the men who work with solvents in good health?

Those who work with solvents should report stomach upset, dizziness or other illness to a physician, since these may be symptoms of exposure to solvent vapors. Alcoholics and those suffering from certain organic illnesses should not work with solvents. In many companies, preplacement examinations are given to employees before they are assigned to solvent operations.—SAFETY RESEARCH INSTITUTE, INC.

How to Take Proper Care of Your Rope

●

REMOVE ROPE FROM COILS PROPERLY

When removing the usual right-laid rope from the coil, make sure that it unwinds in a counter clockwise direction. Lay coil flat on the floor with the inside end at the bottom. Pull end of rope up through center of coil.

STORE ROPE PROPERLY

A dry, unheated room with free-air circulation is the best place to store rope. Place rope in loose coils off the floor on wooden grating, or hang on a wooden peg.

DRY ROPE PROPERLY AFTER WETTING

A wet rope should never be stored — make sure that it is thoroughly dry, to avoid loss of life and strength.

KEEP ROPE CLEAN

If your rope gets dirty, wash with clean water —dry thoroughly before storing.

DON'T OVERLOAD ROPE

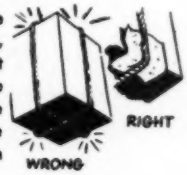
The safety factor of a rope is the ratio between minimum breaking strength and the load applied. A safety factor of 5 is recommended under ordinary circumstances. Allow for the condition of the rope when determining the safety factors.

SLACK OFF GUYS

When ropes are used as guy lines and other supports, exposed to weather, they should be slacked off to prevent overstrain due to shortening from wetting.

AVOID SHARP ANGLES OF BENDS

While fiber rope is more elastic than wire rope, it is good practice not to subject it to sharp bends, which reduce the tensile strength of rope by putting extra strain on the outer fibers.



SHEAVE ROPE RIGHT

Small sheaves increase both the wear on rope and the friction load. Never use a smaller sheave than is recommended for the size of rope you are using.

REVERSE ENDS

Reverse rope, end-for-end, periodically, as in tackle use, so that all sections of the rope will receive equal wear. When rope wear is localized in a short section, periodical shortenings present a new wearing surface.

DON'T LUBRICATE YOUR ROPE

A well-made rope is properly lubricated by the manufacturer—and is adequate for its service life.

AVOID KINKS

If the use of rope involves continual twisting in one direction, compensating turns must be thrown in or out to avoid damage to the rope structure.

AVOID UNNECESSARY WEAR AND ABRASION

Surface wear may come from allowing one rope to chafe another, or by dragging it over sharp or rough objects.

When rope must run over some surface, such as cleats, winchheads, etc., be sure that the surface is smooth.

PROTECT ROPE FROM CHEMICALS

Many chemicals are very injurious to rope fibers. Rope should not be stored in close proximity to chemicals, especially acids, alkalies or fumes.

—PLYMOUTH CORDAGE COMPANY

Pulping Dry Broke In Paper Mills

TANY AGRONIN, Chief Engineer
Shartle Brothers Machine. Div. of Black-Clawson Co.

Handling of broke is becoming an important problem in most of the larger paper mills. It is especially important when the cost of labor is increasing steadily and any manual operation greatly increases the overall cost of the product.

Originally, broke was collected at the dry end of the machine and carried back to the beater room and mixed with stock in the beater. This particular method is still followed by a lot of specialty mills and works out satisfactorily where the tonnage is small and where it is necessary to separate the types of broke due to the numbers and types of paper made. In some mills, a small conventional batch type beater (Figure 1) is used. The broke is then dropped to the chest in which it is to be mixed.

After the continuous or breaker beater was developed, it was installed alongside the dry end of the machine and the broke was carried over to it and pulped continuously. It was then pumped back to either the machine chest or to a supplementary chest from which the broke stock was metered into the machine chest, or metered directly to the jordan head box. Figure 2 covers an installation of this kind with a concrete tub installed at Longview Paper Company.

As the machine tonnages increased, and the problem of handling the broke became greater, various special designs were developed to eliminate broke handling. At the Great Northern Paper Mills in 1928, a special breaker beater was designed, with a special tub in order to handle the broke directly from two of their paper machines. This general arrangement is shown in Figure 4. The tub was extended under two of their machines so that the broke could drop directly from the last dryers to the breaker beater. This installation was so successful that they have thus equipped all of their machines.

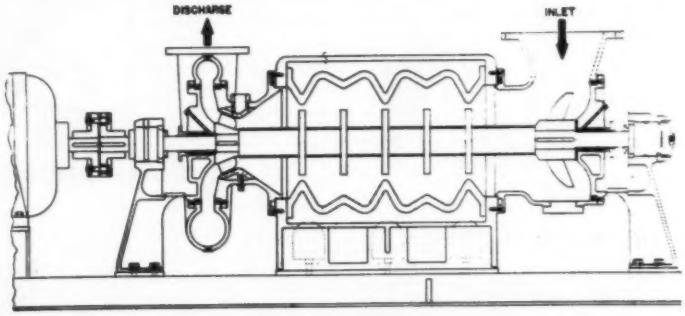
Abridgments in this section are from papers presented at the joint meeting of **Southern and Southeastern Divisions of the American Pulp and Paper Mill Superintendents Association,** Atlanta, Ga., October 21-23, 1948.

However, about eight years ago, a new pulping principle was embodied in a machine called a Hydrapulper. It was not long before attempts were made to introduce this particular pulper for handling broke in mills. The first was installed in a newsprint mill in Canada in 1941. They installed two Hydrapulpers underneath the calenders and since then this mill has installed four more so there are now six of these broke Hydapulpers handling the broke in this mill. A schematic layout of this pulper under the calender stack is shown in Figure 6.

An installation was then developed for a multiwall bag mill on the West coast as in Figure 7. This is a standard 14-ft unit in which the top of the tub is flared up so as to pick up broke from the reel, two calenders, and the last dryer. There is a special by-pass installed next to the last dryer so in case there happens to be more broke made than can be handled by the pulper, the sheet can be by-passed into a pit.

Special showers are spaced around this unit in order to wet the sheet the minute it starts down into the pulper. This is a continuous unit in that the stock is repeatedly pumped away at the same rate at which it is pulped.

There is an automatic control on the regulating box so that the position of the gate is controlled in case of a break. In normal conditions, the top of the gate is



MIAMI STOCK DRUBBER

Figure 10

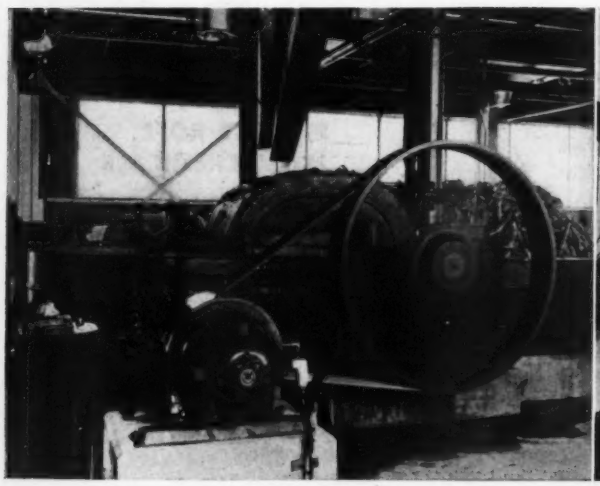


Figure 1

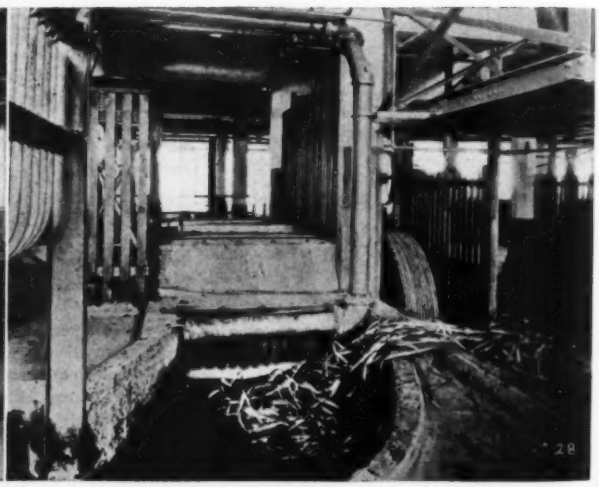


Figure 2

1 2 3 4 5 6 7 8 9

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near the bottom of the tub so that just a small amount of broke is continuously handled at a very low horsepower consumption. In case of a break, the electric control raises the gate so that a large amount of water and pulp can be handled in the pulper. You will note in this particular unit, it runs all the way from 500 lb at the lower gate, setting to 3500 lb at the maximum capacity, based on pulping at 5 per cent.

Herein is one of the basic differences between the installation of a breaker beater and Hydrapulper for handling machine broke. Due to the slower pulping action of the breaker beater, we used to figure the tub size on the basis of handling one hour's production of the paper machine. It is for that reason we use such a large tub on the Great Northern job. Due to the faster pulping time of the Hydapulper, we have greatly reduced the tub capacity, in fact, the maximum at which we figure any of these jobs to date, is to have a tub large

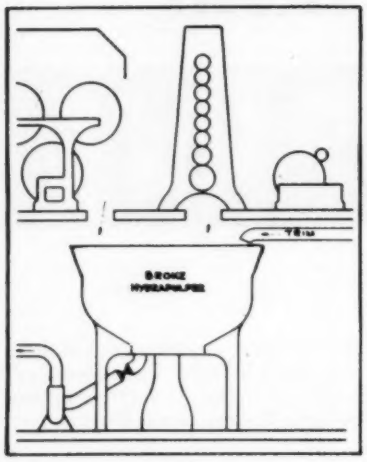


Figure 6

enough to only handle about 15 to 20 minutes of the total machine production.

The second feature of the Hydrapulper is its ability, due to its vertex action, to handle fluffy stock. Any of you who have watched the Hydrapulper will know that this particular vertex will pull in a light fluffy material much faster than can possibly be done by means of a roll in a breaker beater. Thus this unit is more adaptable to certain applications than a breaker beater.

The only disadvantage in a system of this kind is in the basement depth required. In order to take acre of applications in shallow basements, we have developed a horizontal pulper. This unit is an elliptical tank with a rotor at each end and is designed so that, under normal operating conditions when only the trim has to be handled, one rotor will take care of it. In case of a break, the second rotor automatically starts up to maintain the capacity required.

One of the problems in handling broke continuously is to get complete fiber separation. There is no pulping machine developed to date which gives complete fiber separation. Some supplementary means is normally required in order to get the pulp into a completely defibered state. In most cases, the stock is pumped back to the jordan

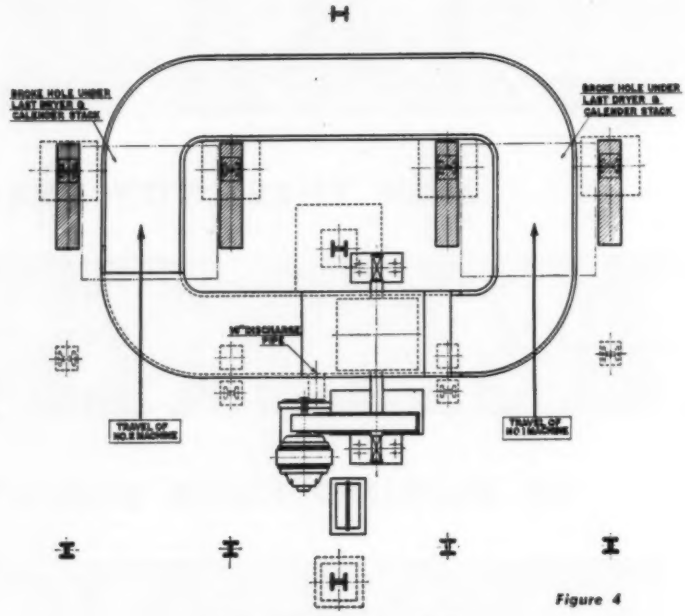
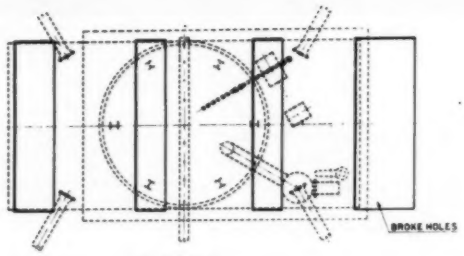

BROKE HOLE UNDER LAST DRYER & CALENDER STACK
BROKE HOLE UNDER LAST DRYER & CALENDER STACK
TRAVEL OF NO. 2 MACHINE
TRAVEL OF NO. 1 MACHINE

Figure 4

BROKE BEATER INSTALLATION SERVICING TWO MACHINES



PLAN VIEW

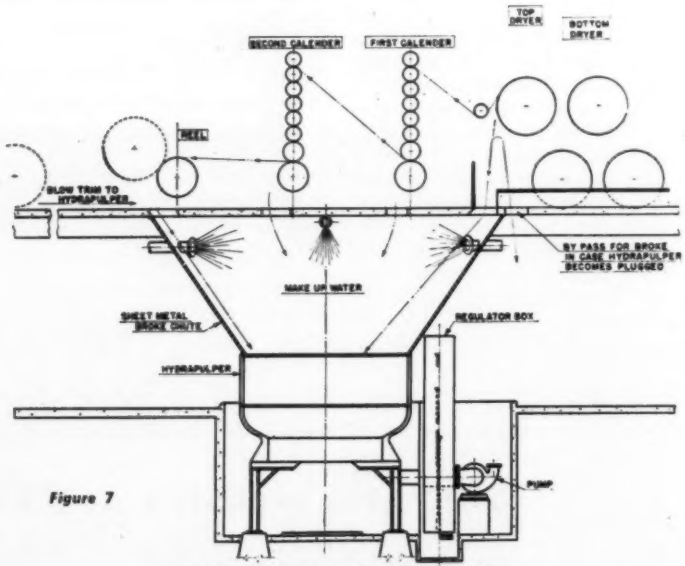


Figure 7

BROKE HYDRAPULPER INSTALLATION

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chest and re-jordaned back into the machine chest. This, however, is not satisfactory in that we have taken the stock which is already correct for the manufacturer of the specific paper required, and have done additional work to it, thus slowing it up. Of course, in most applications, this is taken care of by the metering of small amounts of broke in with the stock.

However, we have recently developed a machine which we recommend for the installation between the Hydrapulper, or breaker beater, and machine or dump chest. This is known as the Miami Stock Drubber, Figure 10. The machine is designed to intensify the defibering action which is obtained from the Hydrapulper by confining the work to a small area.

Felt Conditioning

D. WARREN, Asst. Sales Manager Bird Machine Company

High speed paper machine operation naturally develops production problems as well as advantages and economies. One of these is, obviously, the greater necessity for avoidance of midweek shutdowns, for the higher the machine output per minute the greater the loss of production per minute of "down" time.

One of the principal factors in continuity of machine operation is the press felts. And it is the matter of gearing these felts to high speed operation and keeping them up to the pace of the paper machine that I propose to discuss.

It stands to reason that no felt can stay clean and uniform of its own accord while it is running on the machine. When it is new its makers have put into it all of the qualities needed to make it a perfect carrier for the delicate, water saturated paper web. It is soft. It takes the web through the nip without marking it. It is porous so as to absorb a maximum amount of water at the presses where it can be removed ten times cheaper than at the dryers.

But consider what is bound to happen after the felt has been running for awhile. Repeated passage through the press nip flattens the nap and flattens the threads. Then they harden that way. This affects the ability of the felt to drain the water from the sheet evenly. The loose fibers, filler, and process dirt begins to accumulate on the felt as it would on a filter cloth and it finally becomes clogged. Its resiliency lessens. In time it becomes almost impervious. Water remains on its surface in front of the nip, saturating the on-coming sheet and resulting in "crushing." Uneven water extratcion has a bad effect on paper quality.

Finally, the machine must be stopped and the felt washed and roped. Production hours are lost. Roping does little to restore the resiliency of the felt and washing shortens felt life. Effective felt runs get shorter and shorter until the felt has to be discarded altogether. By use of felt conditioners, the felt may be kept clean and absorbent. Shutdowns for felt washings may be eliminated. The moisture content of the sheet as it leaves the presses is not only reduced, but is more constant resulting in more uniform drying and improved paper finish. Drying is faster and the savings in steam at the dryers may prove substantial.

The conditioner consists of one or more conditioning boxes mounted on a "V" slide supported by fixed bearings on each side of the paper machine. The number of boxes depends on the width of the felt. Each conditioning box is engaged through its mounting with a screw operated by a driving and reversing mechanism, usually driven from the press roll shaft when machine speed is slow to moderate, but generally driven from felt rolls in the case of big, fast running machines.

Now this means that the rolls that drive the conditioners are of relatively small diameter. To take care of this situation, a special high speed gear box provides the reduction necessary for transmitting just the right operating speed for the conditioner.

To each conditioning box there is a hose connected to supply warm water and another connected to a vacuum supply. The conditioning box or "shoe," as it is sometimes called, operates on the working face of the felt and its gradual travel across the felt means that every portion of the felt is subjected to cleaning and conditioning. The warm water is ejected through one or more nozzles within the conditioning box, forced through the felt and pulled back again by the vacuum. The water executes a quick hairpin turn which conditions, as well as cleans, the felt. Travel of the felt across the conditioning box brings this action to bear on all the vertical, or weft, threads and travel of the conditioning box across the felt at right angles causes the same

action on all the horizontal, or warp, threads.

The threads are twisted or rolled slightly, relative to each other, so that the nip of the press rolls and the pressure of the felt rolls is not always exerted on the same part of the thread. This overcomes the flattening and hardening effect and the felt is kept continuously soft and porous and in condition to do its job.

The conditioning box can be moved rapidly by hand if dirt or grease spots get on the felt and need to be removed quickly. A clutch release is provided to permit movement of the box and holding it at the desired point on the felt until the spot is removed.

A design of conditioning box has been developed to meet the extraordinary requirements for conditioning felts that pass over the boxes at a high rate of speed. I am referring now to the new "Jordan" type conditioner box. This is longer and has many more openings than the box used on ordinary paper machines. There are five small slots in the center between the large air openings. These are for warm water introduction. The water goes through the felt and back in a hairpin turn five times as the felt travels across the shoe. The large openings and the holes near the edges suck in the water and flex the felt. More water can be sprayed into the felt and higher vacuum is employed without danger of wrinkling the felt even at the highest speeds. The conditioned felt is able to absorb all the water squeezed out of the sheet.

This "Jordan" type box uses eight gallons of water per minute at 90 to 100 Fahr. temperature. Vacuum is 100 cubic feet per minute with 13 to 15 inches of vacuum.

A lot of these "Jordan" type conditioner boxes are on the job in mills in the South and are proving exceedingly satisfactory for high speed operation and also when the conditioners are installed on more less vertical felt runs. They are easy to apply to conditioners now equipped with the ordinary vacuum boxes. All that is necessary is to be sure that the supply of warm water and vacuum is adequate. With the standard type of box, 3 gallons of water per minute at 15 to 20 lb pressure and 90 to 100 Fahr. temperature is average as compared to the above mentioned 8 gpm for the "Jordan" box. Vacuum for the standard box is 30 to 40 cfm, employing 3 to 5 inches of vacuum as compared with 100 cfm and 13 to 15 inches of vacuum with the "Jordan" box.

Technological Service To Industry

Dr. GERALD A. ROSSELOT, Director
Engineering Experiment Station
Georgia Institute of Technology

The Georgia Institute of Technology is interested in the Association's accomplishments and its aims, and particularly in the success of the industries with which it is associated. Your industrial growth is an asset of importance, part of the South's industrial development. In your prosperity and expansion lies part of the South's future. Our economists tell us that diversity here in the South is the key to our future success. No longer can we stick to just a few industries which have been the specialities of the South for quite sometime. In industry, we must continue to add new activities to these specialities. We believe that the industry which you represent, particularly in its present expansion, is one of the keys to our expansion and to our success. The growth and expansion of pulp and paper is one in which you are primarily interested; consequently, it is one in which we are very much interested. As your industry grows, so do the many collateral and related industries and activities of Georgia and of the whole South continue to grow.

You deal in two of the primary resources of the South, as we see it. These resources are our forests and the abilities of our people to produce. With proper cultivation these both can be increased and their activities increased greatly and we can continue to replenish both of them.

It might be interesting to examine the functions of such a modern technological school. I think we can break them up into three classes:

The first, or primary, function is the training and education of youth, both as professional engineers and scientists and as auxiliary personnel for these professional people in science and engineering.

The second classification entails the prosecution of research. In this modern technological age, research has become almost a keynote, and the word 'research' has become a byword of industry and progress. In the prosecution of research, we might consider some of its functions.

(a) One of the most important things that we have to do is to develop new knowledge—knowledge that might be put to industrial use for a period of some years before it becomes a storehouse upon which engineering and engineering sciences can draw to produce new products, to improve products, and to improve our standards of living.

(b) The second function that we have today (and this is true not only of our own institution, but you will find the same arrangement all over the country), is to direct technological research and develop assistance to industry, both old and new.

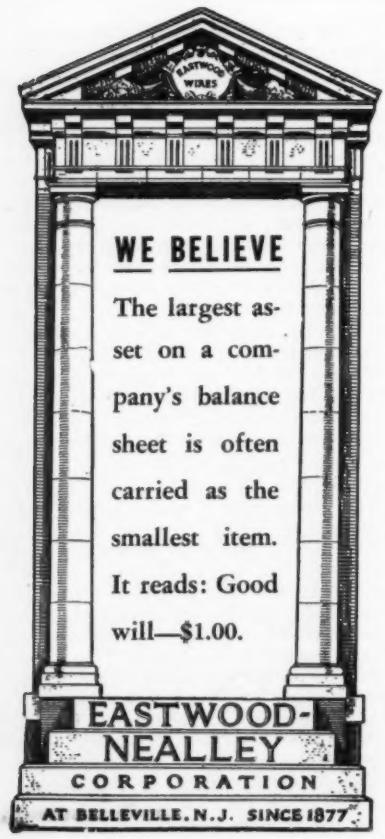
(c) The third function of research, is the development of the community's resources. In that connection, we mean primarily the resources both natural and those that can be cultivated. One of our primary resources here in the South, is, of course, our labor supply. In recent years, personnel management and industrial psychology and time study methods, industrial engineering, and so on, have become more and more important, so that we are getting out now and making studies in psychology and in industrial engineering: actually, we have gone into research, our chief resource.

(d) Fourth, we consider research as an integral part of our educational program. It is impossible to train scientists beyond the bachelor's degree in college without giving them the opportunity of learning the processes and the thinking that is involved in the conduct of research.

The third general classification of the activities of the modern engineering school constitutes, or revolves, around the general dissemination of knowledge through the medium of conferences, short schools, demonstration schools, and through the publication of scientific works and all information of general interest.

We are unable as a public institute to operate for anyone, of course, without paying for the expenses. But if you engage us for industrial research, it is entirely possible that you may contract for the information and all the rights that may develop from the conduct of such work. Within our research organization, we have a large number of technological people representing the various techniques of the modern day science. We are extremely well equipped with equipment and short on buildings. But it takes equipment and people to do research, and we struggle along without the buildings —without the fancy ones until such a time as we can get them. We will guarantee you good research results in anything that we undertake for you. We are developing some specific facilities over there that relate to specific industries. Services are charged out to the industries that are sponsoring them. We do a considerable amount of work with various associations and organizations of your type right here.

Some of you, of course, have read the problems of the recent pulp and papar mills stream pollution here in the South, some of which have been in the press during the past few weeks. One of our facilities that we are developing quite extensively, at this time, is our sanitary engineering courses and our sanitary engineering laboratory.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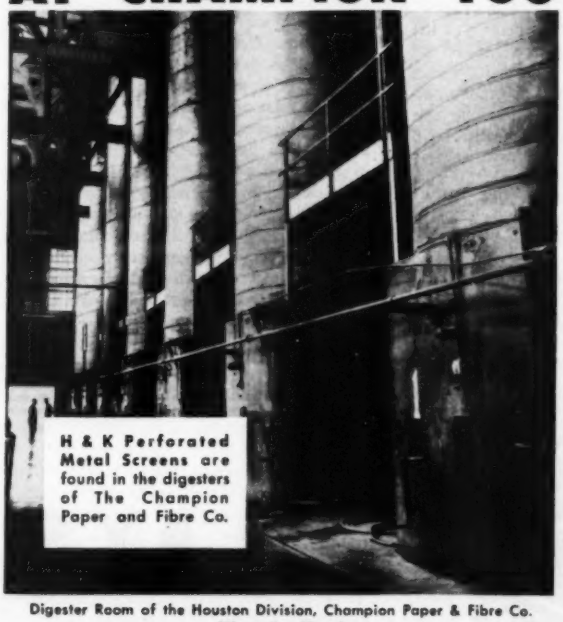

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Chemical engineering and mechanical engineering seem to be two of the things that are quite important to the pulp and paper production industry. We do not have a large number of specific courses over there, or specific activity as related to pulp and paper, because it looks to us, having talked to some of you, that the thing we can do best for you is to educate men in the fundamentals of engineering and science and to let you do the final training in your art and craft as you need them. If such times come, that you need further specific work, we will be delighted to set it up for you, and I think you will find that we will be able to work together with you quite well.

Another aspect of the school is our extension work. This division is charged with the operation of short schools or with symposia and conferences; it operates the evening school in appropriate fields for a great number of people in the immediate area who are unable to obtain education beyond high school level in mathematics and in general sciences; and can assist them in the development of their particular jobs and their personalities in those jobs.

One new thing has been added here in the last few months. That is the Technical Institute which is located out at the Naval Air Station at Chamblee, Georgia. The Technical Institute is training people at an intermediate level. It has two air terminal courses, but does not train professional engineers. It does train the auxiliaries to the professional engineers. It is now in its third quarter of operation and expanding quite successfully and quite nicely. I think you will find, as that institute grows, and as others are established over the state under the guidance of Georgia Tech, that you will have a very valuable source of supply of personnel at the intermediate levels which expanding industry always needs. You will have young men who are quite expert and who will be able to do a little bit of their own thinking and operate without a handbook. They will develop into excellent foremen, and some of them, of course, will keep right on going.

We have a Chemical Engineering Department, a department with courses in pulp and paper technology which are being given to familiarize our chemical engineers with some of your problems. Some of our further research work relates to the utilization of pulp and paper materials here in the South and to improvements in processes. We are developing a small particle technician laboratory. We are hearing a great deal more today of particle size technology, the importance of particle size, and so on, to many of our industries. Some of the problems that you have particle size in the kaolin are being studied, for example; you use that, of course, in your finishing work.

Paper Mill Lubrication

W. B. SHIRK[1] and J. H. HOOTEN[2]

Why do we lubricate? Possibly the most important reason being to substitute fluid friction for metallic friction, minimizing wear and allowing rotating parts to move with a minimum of power. Actually, the lubricant performs the function of replacing solid friction with fluid or film friction. In other cases, lubricants will serve as a combination of a cooling medium and a lubricating medium; when in free circulation the principal function is to transfer heat from the moving parts. In either event, the lubricant has a very direct relation to the maintenance of the equipment and the production of the machines.

Any attempt on our part to outline recommendations of oils and greases for each application would be impossible. In practically every mill, special pieces of equipment and operating conditions, peculiar to that plant, require individual consideration. Our discussion of lubricants and their applications will, therefore, be general in scope and brief on specific applications.

Beginning with some outside equipment or preparatory equipment, such as barking drums and conveyors, the first thought that enters our mind is the ruggedness and weight of this equipment. The main bearings of this equipment are most generally of the plain babbitted type, and are limited by their design to retain only measured amounts of lubricants. The bearing and other operating mechanisms of this equipment are subjected to heavy and shock loads. Dirt, dust, and atmospheric conditions also have their effects on the operation of this machinery, the type of lubricant that can be used and the frequency at which the lubricant must be applied. The most advanced type of lubricant available for enclosed reduction gear drives are the extreme pressure lubricants. These E. P. Lubes provide maximum protection of the rubbing surfaces during peak loads, and they minimize the chances of corrosion on gear teeth and in bearings, due to moisture contamination. Gear cases should be drained and flushed at regular intervals and the periods between draining and cleaning will be governed by operating conditions. The breathers should be cleaned at possibly more frequent intervals so they can better function to prevent the entrance of dirt and to allow the gear case to vent properly.

During shutdown periods, the gears should be inspected and the bearings checked for clearance and adjustment. Accurate records of drain periods will greatly aid the oilers in effecting regular drain periods. This can be accomplished by painting the date of the drain on the gear case, or by the use of card index records. Many mills use a combination of both and use the card index mainly to keep permanent records of oil changes and repairs.

The large majority of chippers and grinders are now equipped with antifriction bearings, grease lubricated. The bearings of these machines are subject to shock loads, and operating temperatures are rather on the high side. Grease should be applied at regular intervals and the "lubriflush" principle should be employed, wherein fresh grease can be forced through the bearing and the relief plug left out for a period of fifteen to twenty minutes so pressure and excess grease can escape.

Rotary kilns interpose problems in lubrication as the lubricants are subject to high transmitted heat, high pressures and shifting loads. Often it is possible to improve the application of lubricants to the exposed parts of kilns, such as the tread rings, rollers and girth gears, to the extent that more effective performance of the lubricants will be attained, and the frequency of application reduced. Special care should be exercised to assure adequate drain periods of gears and other enclosed mechanisms.

In recommending lubricants for beaters, jordans, Hydrafiners, and other machinery used in the pulp mill, full consideration should be given the operating conditions. Beaters equipped with plain bearings are usually grease lubricated and block greases are employed for their lubrication. This

(1) Chief Lubrication Engineer Gulf Oil Corporation, Pittsburgh, Pa.; (2) Division Lubrication Engineer, Gulf Oil Corporation, Atlanta, Ga.

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block grease should have the necessary characteristics to withstand the high temperatures of the bearings and to resist the water hosing of the clean-up crews. Beaters and other machinery equipped with antifriction bearings should use grease suitable to the operating conditions. Extensive tests have shown that only the grease which is immediately adjacent to, and in contact with, the bearing takes part in the lubrication.

Excessive grease in the housing is, therefore, of no value insofar as lubrication is concerned. Excess packing of grease in the bearings will result in a churning action of the grease, which in turn will cause overheating, breakdown of the grease, and a loss of grease. Overgreasing should be avoided, and the oilers fully instructed as to the proper methods of application and the detrimental effects that can be caused from overgreasing. In selecting greases for antifriction bearings in the pulp mill and for other applications where wet conditions exist, keep in mind the fact that sodium-base greases will absorb a limited amount of water. On agitation, soda-soap greases will form a noncorrosive emulsion when mixed with the limited amount of water or condensate. Should water gain access to the bearings during idle periods, then the chances of corrosion would be high. When moisture conditions do exist, a more frequent application of grease is often necessary to compensate for the water.

Lime-soap base greases, which are water repellent, must be used on those applications where the pressure of the water is sufficient to wash the lubricant away. Many jordans and Hydrafiners are equipped with antifriction bearings that are lubricated by an oil bath. Here again, it is of prime importance that the lubricant provide maximum protection against corrosion and be of sufficient body to assure proper lubrication. Oil lubricated bearings can be drained easily at regular intervals to remove water or condensate. Suitable oil level devices are available that will allow less frequent application of the lubricant and provide a larger clean reserve supply of lubricating oil.

Reduction gear drives of pulp mill machinery should have the same careful attention that is provided for other gear units. In addition, we should guard against water that may be washed in through the breathers or vents of the gear cases. Provide gauges for gear cases that will allow the oilers to maintain the proper level when the unit is operating or standing. This type of gauge is especially advantageous should seals suddenly start leaking oil and cannot be repaired without a production interruption until the next shutdown. The same procedures, as previously discussed, should be followed when the gear units are drained and flushed.

The wet ends of paper machines offer bearing lubricating problems that are common to many pulp mill applications. The table rolls of the fourdrinier sections, the suction couch and press rolls are subject to water and stock contamination. Advanced designs of these parts provide deflectors for the bearings that prevent, in a large measure, the entrance of water and stock into the bearings. The deflectors function somewhat as a primary seal for the bearing housings.

In mills, where the excessive entrance of water and stock is a problem, a lubricant of proper grade to provide protection against corrosion is necessary. This lubricant must be of proper make-up and consistency to withstand the washing action for reasonable periods between applications. On suction couch rolls where the washing action of the water is great, greases that are water repellent must be used. Suction couch rolls must be lubricated at more frequent intervals due to the water washing through the bearings. The grease should be applied on the "lubriflush" principle, and at the regular intervals, if the bearing wear is to be held at a low minimum. Another fact regarding antifriction bearings that we should bear in mind, is the use of properly designed bearing closures, along with selection of the proper type of lubricant.

In recent years, the paper and felt dryers of paper machines have been equipped with antifriction journal bearings and the driving gear mechanisms of the machines have been fully enclosed. Further, many older machines have been modernized along the styles of the present paper machine designs. With the improvement in machine design, lubricating systems have also been improved, and lubrication of these parts is now effected through the use of circulating oil systems. This modern method of application has simplified lubrication and maintenance problems on the large paper machines and has effected savings in lubricant costs by prolonging the life of the lubricants.

In circulating oil systems, the control of oil temperatures and the rate of oil flow to each part is possible. By using separate pumps for circulating the oil to the bearings, and separate pumps for circulating the oil to the gears, even more effective control can be maintained. Through this method of circulation, the bearings will be assured of an adequate supply. This is not always true when one pump is used to circulate the oil to both the gears and the bearings. The control of oil temperature has a very definite relation to the life of the oil. Ten to twenty Fahr. rise in oil temperature will increase the rate of oil oxidation by fifty per cent, and with this fact in mind we can more readily appreciate the advantages of oil temperature control.

The rate of oil flow to the bearings has a very definite relation to bearing cleanliness. Restricted flow of oil through the bearings definitely will cause excessive deposits. Under the high bearing temperatures it is detrimental for excessive amounts of oil to remain in the bearing housings, therefore, the inlet should be of sufficient size to provide an adequate quantity of oil, and the outlet side somewhat larger to allow rapid removal of the oil. Antifriction bearings must have a reasonable amount of care, and, in some respects, they require more attention than the old plain bearings that were ring oiled, collar oiled, or lubricated with block grease. Proper clearance at the time of installation is of great importance and the bearings should be inspected at regular intervals.

One successful plan that has been followed by a number of mills, is the inspection of a certain number of bearings on the machine during each shutdown. Bearings that are found to be dirty can be cleaned and the contributing cause can be located and corrected. Records should be maintained that will give information showing date of inspection, mechanical and physical condition of the bearings and a record of bearing replacements. Through regular inspection, bearings that are likely to fail can be detected and replaced to prevent a forced shutdown. In many instances, it is possible to turn the bearings 180 degrees and threby prolong bearing life.

Lubricants for antifriction bearings should provide lubrication for the sliding contact that exists between the retainer and other bearing parts, and provide a film to prevent any contact between the races and rolling elements which is not true rolling, or lubricate the rollers and guiding elements in roller bearings. The lubricant should also provide protection for the polished surface against corrosion. While the latter is considered a secondary function, we have found evidence of corrosion in a large number of machine bearing failures. Lubricants have been developed, and are being used widely, that will afford maximum protection against corrosion and will materially aid in keeping bearings clean.

The circulating systems and sight feed gauges should be inspected at regular intervals to assure proper function of the system. It is necessary to clean filter bags at regular intervals, as well as the oil tanks. The interval of cleaning will depend on the design and capacity of the system, operating conditions and temperatures, and on the grade of the oil that is used. The average length of time between tank cleanings will usually run twelve months. Modern circulating oil systems allow sufficient capacity so one hundred and twenty minutes precipitation time is possible. These systems also provide separate pumps for bearings and gears, and are equipped with suitable oil coolers allowing more effective temperature control. Separate oil circulating oil systems for calender stacks are advisable as it has been found that excessive contamination of the main oiling system can come from the calender stack bearings.

A problem in a number of mills involves the corrosion of calender roll surfaces during idle periods, and during the storage period after the rolls are ground. Products have been developed that will minimize the corrosion of the calender roll surfaces during these periods. A product that can be applied easily to the calender roll when the calender is being shut down, will give maximum protection against corrosion. This product will be removed readily when the heat is again applied to the calender roll, and by the first few feet of paper passing through the rolls. Other products have been developed that may be applied to the rolls after they are ground and before they are stored. These products will prevent corrosion during storage and can be readily removed with petroleum naphtha prior to their installation in the calender.

Controlled Stock Flow To the Machine

R. L. KUTTER, V. P. & Sales Mgr.
The Black-Clawson Co.

Outside of the preparation of the stock, most formation difficulties originate in the approach flow to the forming part of the machine, that is, the head box of a fourdrinier of the forming area of a cylinder machine.

Several factors are involved:

1) Velocity and volume of discharge should be the same per unit width all the way across the machine.

2) Fiber distribution in the water should be uniform.

3) Eddies or turbulence is always present and cannot be avoided. These eddies should be kept to a minimum since large eddies tend to cause unequal fiber distribution, thus disturbing formation.

In the case of multiple pipe inlets, stock will enter only at the point where the pipe inlets are located, making cross currents and large eddies.

Where hopper type inlets are used, the flow cannot be paralell due to the nature of the inlet passage and, therefore, there will be cross currents in the head box approaching the slice or in the vat as the case may be.

In many instances, long hopper inlets have been designed with the idea of accomplishing proper fiber distribution, however, if it is felt that the friction of the side walls on these hopper installations tends to cause a segregation resulting in a lower fiber density at the extreme edges which may eventually result in light sheet edges.

Another approach flow arrangement frequently used is the one in which two or more screens discharge directly into the flow box. In cases of this kind, the variations in consistency of one screen to that of the other screen will cause similar variation in consistency of the stock approaching the slice, thus affecting the weight of the sheet accordingly since it is almost impossible to mix the flows coming from the individual screens before they enter the slice. One way to overcome these difficulties, to some extent, is to have the stock from the various screens discharge into a common screen collecting box from where it would flow directly into the head box through a common pipe in which all of the stock has to be mixed together. An even better mixture of the various stocks could be obtained by passing same through a centrifugal pump rather than to discharge it directly from the collecting box into the head box by gravity.

Where screens discharge directly into the head box, the consistency coming from the screens will vary from time to time depending upon the amount of shower water on the screen, and the amount of open area through the screens as they gradually become plugged, and this means there is a constantly varying fiber concentration in the stock causing the sheet to be heavy in one place at one time and light in another place at the same time, but varying from time to time. This has been found definitely to be the case in several instances where elaborate tests have been made and observations of conditions over a protracted period of time.

A continuous slot orifice, the full width of the machine, appears to be one solution to uniform flow distribution. Even with a continuous slot orifice it is, of course, necessary to have uniform pressure differential across the slot, and that can only be obtained by having substantially uniform velocity of the stock in the duct ahead of the orifice. This

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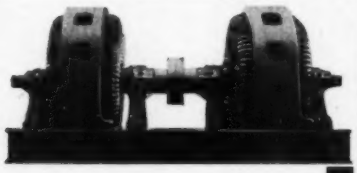

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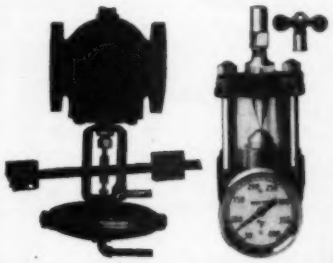

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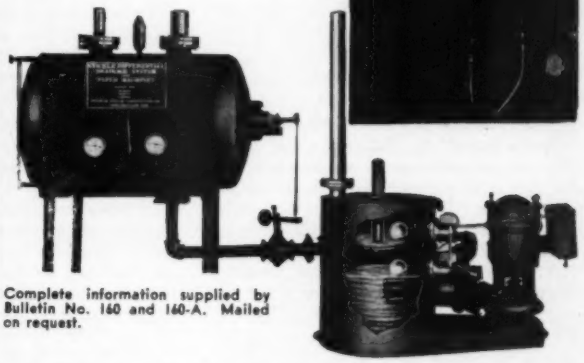

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can be obtained most effectively with a tapered duct arrangement.

In order to obtain uniform fiber distribution across the width of the machine, it is, of course, necessary to have all of the stock subjected to the same hydraulic treatment in approaching the head box or the vat, otherwise, centrifugal forces will cause segregation of the stock with greater density in some places than others, depending upon the flow of conditions.

The "Hydronamic" inlet, as such, consists of two tapered ducts extending across the width of the machine with the stock coming in at the large ends and flowing in opposite directions, but with a common slot orifice for the two tapered ducts. The vertical partition plate, between the two ducts, is disposed paralell with the slot orifice the length of which is equal to the full deckle width of the machine, with the top of the partition plate being about one to two in. below the slot.

Stock is supplied to the inlet by means of a branch cross pipe, permitting approximately one-half of the total stock to enter the large end of one duct from the front side of the machine, and the balance of the stock entering the large end of the duct from the back side of the machine.

As the stock flows from the large end of the duct towards the small end, it is discharged through the slot orifice and since the cross sectional area of the duct diminishes at the same rate as the longitudinal flow in the duct diminishes, the stock velocity must, of necessity, be the same at all points across the width of the machine. This naturally assures a uniform pressure differential across the slot orifice which in turn results in uniform stock discharge.

In this way, the same conditions, as to velocity and flow, exist all the way across the machine, thus enabling the inlet to discharge the uniformly distributed stock into the head box or the vat with a minimum of cross currents or eddies.

Flocculation is an important factor and the quicker the stock can be gotten onto the wire or into the vat after it has been thoroughly dispersed, the less chance there is of flocculation occurring. Travel of the stock from the inlet to the slice or to the forming area of the cylinder mold should be as short as possible.

It is also a well-known fact, that the stock flowing onto the machine should be as completely deaerated as possible. On fourdrinier machines it is our opinion that the wire pit must be made deeper and longer than usual and be provided with baffles so as to carry the white water from the tray spouts up to the extreme end of the pit near the breast roll, permitting a maximum retention time, causing air bubbles to rise to the surface while the white water is flowing toward the discharge of the wire pit. Ample depth of white water over the flow pump suction connection must also be provided to prevent the formation of a vortex and subsequent entrainment of air.

On cylinder machines, deaeration of the stock can be approached by preventing, as much as possible, the air from entering into the stock by white water cascading over the overflow dam of the uniflow vat, or over the dam of the screen collecting box when the stock enters the mix box.

Instead of the conventional regulating box with orifice gates, from which the stock cascades into a pipe line leading to a pump suction, special metering valves may be provided in the stock line near the point where the stock pipe goes to the pump suction. This metering valve may be motor operated by push button control from the machine room floor with an indicating meter to show the degree of opening of the valve. The valve, of course, can also be manually operated if desired. In either case, the stock pipe is completely full of stock throughout its entire length and up into the regulating box, which is full to the point of overflowing the spill dam which maintains a stock level at the same height at all times.

One of our latest installations has also been equipped with a zero speed instantaneous shut off control arranged so that if the fourdrinier wire should stop for any reason, the couch drive is instantly shut down, the new stock is shut off by a quick acting air operated valve, the flow pump drive is de-energized, stopping the pump, and the liquid level control or pressure regulating system is also instantly de-energized, thereby maintaining its setting in the normal operating position.

Means of quickly stopping the couch roll in case the wire freezes to the suction boxes, prevents turning of the couch roll inside the wire. The instant shutting off of the stock prevents the filling up of the system with heavy stock. Equally rapid stopping of the flow pump prevents flooding the wire and in case of a head box, rapidly dumps the head box by reverse flow through the pump into the wire pit with the pump impeller rotating in reverse direction.

Pulp and Paper Industry Stream Pollution

RUSSEL L. WINGET, Executive Secretary National Council for Stream Improvement

I think that possibly some of you may have read an editorial on stream pollution which appeared in the October 9 issue of *Collier's*. I am not going to comment at any great length on the editorial except to say that it views with alarm the "dumping of sewage and industrial wastes into any available water" and invites those interested to air their views. I imagine that we will see some weird articles in *Collier's* in the next few months, but I hope that some of them will give some credit to the work that industries, particularly the pulp and paper industry, are doing to correct the situation.

Looking at the problem from the industrialist's rather than the conservationist's point of view, we find that concepts of a somewhat dissimilar nature are involved. Naturally, economic considerations must be considered and this, to a large extent, explains the difference between the conservationist's and the industrialist's viewpoint.

In this connection I recall a statement of Dr. Beal, Assistant Director of Mellon Institute, at the time that organization was involved in the study of deinking mill waste treatment. In referring to the possibility of financing waste treatment by the recovery of utilizable materials, Dr. Beal stated that if nothing else could be recovered, the prospect of recovering usable water for processing operations was attractive. From what we hear from papermakers, I am inclined to think that in some cases it is almost as difficult to make paper with some of the stuff we find in our rivers as it is to drink it.

Since 1945, legislation embodying new pollution bills or amendments to existing control measures was introduced in almost all of the 37 pulp and papermaking states.

In the Southern and Southeastern regions these include new legislation in North Carolina, Mississippi, Tennessee and Virginia and amendments to existing controls in a number of other Southern states.

On the Federal level there was enacted in 1948, U.S. Public Law Number 845, more generally known as Barkley-Taft Bill (S. 418), which brings pollution of interstate waters under Federal control.

On the interstate level we have had, in more or less chronological order, the appointment of the Interstate Commission on the Delaware River Basin with jurisdiction over waters of the Delaware River in New Jersey, New York, and Pennsylvania, and the Interstate Commission on the Potomac River Basin which brings under less formal control, pollution in the Potomac River Basin in the states of Pennsylvania, Maryland, Virginia and West Virginia. More recently there has been enacted the New England States Water Pollution Control Compact which, although currently approved only by Massachusetts, Connecticut and Rhode Island, will in all likelihood ultimately bring all of the New England States under some degree of interstate control insofar as pollution matters are concerned. Finally there was enacted in 1948, the Ohio River Valley Water Sanitation Compact, affecting all of the Ohio River Basin in the States of Pennsylvania, Illinois, Indiana, Kentucky, New York and Ohio.

Generally speaking pollution can be said to fall under three general classifications: natural pollution, pollution from domestic sewage, and industrial pollution.

Natural pollution, resulting from silt, decayed vegetation and other natural materials, we may ignore for the purposes of this discussion.

Pollution from municipal sewage constitutes, by far, the greatest actual and potential menace to public health and decency. It is well known that the presence of disease organisms, originating from untreated human wastes, in public water supplies are responsible for recurrent epidemics that even today menace many highly populated sections of the country. The treatment of municipal sewage is, moreover, a matter of relative simplicity since the techniques for treating the waste are well established and remedial works can be financed through public funds or through the relatively modern device of sewer rentals.

Industrial wastes, including that from the pulp and paper industry, also constitute an important source of pollution. It may be pointed out, however, that in a sense it is of less public concern than pollution from domestic sewage because it does not constitute a menace to public health. It must be recognized that industrial pollution does, in some cases, constitute a public nuisance and may prevent the use of the receiving

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waters for certain recreational uses even though a direct menace to public health is not involved. In connection with industrial wastes, it must also be recognized that, due to the complicated chemical nature of the wastes, treatment techniques are not readily available as in the case of municipal wastes.

Our organization has tried to establish policies which would give consideration to all of the diverse factors involved. We subscribe to the concept held by many stream sanitation authorities that the use of the streams for the transportation of wastes is a proper use, providing such use does not constitute a menace to public health, does not create a public nuisance and does not prevent the use of the stream for the purpose to which it is normally put. Although our research program is two fold, including both utilization and abatement, we feel that the primary effort should be devoted to abatement which because of public pressure cannot wait for the development of utilizable materials to pay the cost of treatment. We also feel that in any program of waste abatement, consideration must be given both by regulatory agencies and by industry to the public and private equities involved. These briefly are the policies we have formulated and which have served as a guide in the orientation of research and other activities.

In the early days of our activities the accent was on research, as it was necessary to accumulate a background of information in this somewhat new field. With this in mind, research projects were originated and are still being carried on at ten outstanding research organizations. The roster of research organizations currently employed by the Council includes the following: Mellon Institute of Industrial Research, where acid and alkaline bleachery wastes and inter-industry pollution problems are being studied; Purdue University, carrying on with strawboard waste research instituted two years ago; Rutgers University, engaged in white water problems; University of Michigan and Kalamazoo Colleges, assisting in the study of deinking wastes; Institute of Paper Chemistry, studying aquatic biology problems; Manhattan College, where stream analysis work is centered; Virginia Polytechnic Institute, investigating semi-chemical waste problems; Louisiana State University, currently engaged in studying biological processes applicable to kraft mill waste treatment; and Oregon State College, where a dual project, dealing with yeast production from waste sulphite liquor and aquatic biology problems, is under way.

In addition to the above research projects, a number of additional problems, referred to us by individual members, are also being studied. These include: the study of color problem, a joint activity by the Council and the Tennessee Valley Authority; sludge dewatering studies, a problem of almost universal interest; the application of supersonic principles to paper mill waste treatment; and a number of other problems, some of local interest only.

After periods of study, ranging from 1 to 3 years, we find that in a number of cases, laboratory developments are indicating solutions to the problems involved. This has made necessary an expansion of the program in two respects. It has been necessary to construct pilot plants in which the laboratory techniques can be adapted to actual practice in pilot and plant scale treatment works. The Council is currently operating six such experimental plants at member mills. Also has arisen, the necessity of making the services of Council technicians available to member mills so that techniques developed in the laboratory can be applied to actual mill operations. In six of the seven regions of the United States, arrangements have been completed whereby such direct mill service can be made available to members for assistance on current problems on request. It is not our intention in this activity to invade the consulting engineer's field but rather to advise and assist members in pollution problems in the light of the knowledge gained through our research.

I would like particularly to emphasize the assistance the Council can give in connection with new mill site location problems. Obviously the best time to consider pollution problems is before the mill is built. Knowing the size and type of mill and the flow and usage of the river which will receive the waste, it is possible to project data which will indicate the seriousness of the future pollution problem. In many cases, where adverse conditions exist, a change in proposed site locations may be considered.

Having informed you as to the Council's general activities, I believe it would now be appropriate to discuss in detail our activities in connection with paper industry

problems in the southern and southeastern regions. Since kraft pulp production predominates in the South, the first project undertaken by the Council was in connection with kraft waste disposal problems. This investigation is being carried on at Louisiana State University at Baton Rouge, Louisiana, under the direction of William Moggio, the Council's project leader.

Here we are attempting to determine the fundamental factors influencing the natural purification of kraft mill waste water so that this knowledge can be applied in the development of a dependable treatment process of reasonable cost of installation and operation. The first task was to develop a reliable and reproducible test for oxygen demand of this waste. Following this, the effect of various factors on the purification occurring in storage was investigated. The next step will be to investigate the effect of certain other factors, the bacteriology of the process and the exploration of further means of stimulating purification work.

Another project of increasing interest to Southern operators, is the investigating of methods of treating semichemical mill wastes which is being carried on at Virginia Polytechnic Institute. Coagulation and filtration studies dealing mainly with various types of lime treatments were undertaken. The effect of time, temperature, concentration and conditioning chemicals were investigated and the B.O.D. solids and color determined. Studies on the use of oxygen for stream aeration and experimentation as to methods for direct oxidation have recently been initiated. Following this, the effect of different cooks and different species of wood used on the pollution problem will be investigated.

Another problem of widespread interest in the South, is the treatment of bleachery wastes to render such wastes fit to discharge into the stream. Mellon Institute investigated this problem in its preliminary phases. At this time the Council is, in co-operation with a Southern member, conducting pilot plant studies in which the possibility of integrating bleachery waste treatment with lime recovery is being studied.

A problem of interest wherever kraft mills are operated, is the possible effect of kraft mill wastes on aquatic environment. Studies conducted at kraft mills in Wisconsin, and on the West Coast indicated that with normal dilution, toxic concentrations were not sufficient to cause injury, either to fishes, native to these regions, or to typical fish food organisms. In the South, this problem in aquatic biology is assuming increasing importance. The problem is aggravated by the intermittent nature of the flow in Southern streams where the summer months' stream flow is, in some cases, reduced to the point where the mill waste constitutes a large part of the total river flow. Surveys have been conducted at several member mills in the South to determine the likelihood of concentrations toxic to the native flora and fauna developing.

I believe it would be of interest to discuss briefly the pollution control provisions of the several Southern States since in recent months, with the passage of the Barkley-Taft pollution bill, a decided increase in pollution activities on the state level has been noted.

Georgia has not followed the lead of other southern states which have recently enacted so called "pollution bills," but rather the State Board of Health carries on under the provisions of the Georgia Code of 1933. We have found the state officials very co-operative.

In Virginia, water pollution control is vested in the State Water Control Board under the provisions of a new law, enacted in 1946. Under this law, polluters established prior to the enactment of the law, are permitted to discharge wastes up to the quantity prevailing during the year previous to the enactment date. New pollution or additional discharge at old outlets is permitted only after review by the Board.

North Carolina previously centered stream pollution control activities in State Stream Sanitation and Conservation Committee under an act enacted in 1945. Recently this law was declared unconstitutional and a new law is currently being prepared. At present, the only regulation is that waste discharges shall not affect public water supplies.

In Tennessee, control is vested in the Stream Pollution Control Board provided for by Chapter 128 of the Public Laws of 1945. Rather stringent stream standards have recently become effective although the State Health Officer has been very co-operative in current pollution cases.

In South Carolina, control is vested in the State Board of Health and the State Board of Fisheries, under the Code of 1932 and acts since that time. Provisions have been made to conduct a stream survey under the direction of the New Water Resources Committee. Mississippi enacted a new bill in 1946, empowering the Game and Fish Commission with power to control pollution. Municipal pollution is specifically exempted from the provisions of this law and industrial polluters may discharge only under license.

In Louisiana, pollution control is under the Stream Control Commission with the Department of Conservation designated to enforce the provisions of the law, which was enacted in 1940. The Department has been quite active in moving against industrial pollution although rulings have not been unreasonably stringent.

In Florida, control is under the State Board of Health, under amended laws dating back to 1927. The Chief Health Officer understands industrial pollution problems and in recent months the Game and Fresh Water Fish Commission has shown increasing interest in industrial pollution affecting fisheries.

Alabama control is in the State Board of Health and the Game and Fish Commission under the Code of 1928 with amendments to date. Principal interest is shown in connection with protection of public water supplies.

Overriding the individual state stream pollution control measures, is U.S. Public Law No. 845, otherwise known as the Barkley-Taft Bill (S.418). This law places responsibility for the regulation of water pollution in the Surgeon General of the United States Public Health Service, under the supervision and the direction of the Federal Security Administrator and the Federal Works' Administrator. A water pollution control advisory board is provided for, consisting of the Surgeon General, an Army representative, Department of the Interior representative, a Federal Works' Agency representative, a Department of Agriculture representative and six persons to be appointed annually by the President. Since the paper industry has taken a leading role in stream improvement activities, efforts are being made to have a representative of this industry on the board.

This act is supposed to affect interstate water only, however, since tributaries of interstate waters are included, and since recent rulings seem to be to the affect that water draining to the Atlantic and Pacific Oceans are considered interstate, it would appear that all or most of the rivers in the United States would be included.

Briefly, the bill provides that whenever the Surgeon General, on the basis of surveys and investigations, finds that pollution affecting interstate waters is endangering the health and welfare of persons in the state other than that in which the discharge originates, he shall give formal notification to those responsible and advise the state agency where the discharge originates. Following such notification, a procedure is set up in the act which provides for ultimate hearings and decisions by a court of proper jurisdiction. In all such decisions, the public interest and the public and private equities involved shall be given consideration.

Since the enactment of the Barkley-Taft Bill, we have noted that there has been an increase in enforcement activities on the state level and this was previously anticipated

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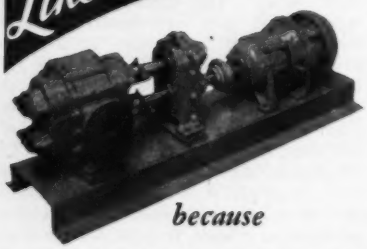

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when the bill was under discussion in Congress.

In concluding, there is a thought which I would like to leave with you. The pulp and paper industry, at a considerable expense, has set up this National Council for Stream Improvement for the purpose of assisting the industry in a problem of national importance. The Council has conducted research for several years and has on its staff, technical men, who by their previous training, experience and knowledge gained from the Council's research projects, are well qualified to assist mills in their pollution problems. Technical personnel is available in each state to assist individual mills, and it is hoped that all of those having problems of a nature falling within the scope of the Council's activities will make use of the services which are provided.

Waste Disposal Problems

DR. HARRY GEHM, Technical Director
National Council for Stream Improvement

I would like to explain why we are interested in the purification of kraft waste by direct oxidation. The experimental work, which has been conducted by a number of mills over the last five years, has shown that if we separate the bulk and fiber from the over-all kraft mill waste and just store it, we will get a considerable degree of purification, in some cases as high as 90 per cent. Since this has been the only successful method of purifying the waste, despite the fact that a number of the common methods have been tried at great length in small scale operations, we picked on this as the one to experiment with. In fact, three mills now, or possibly four, in the South are employing this method of storing the waste for periods of about 20 to 30 days with different degrees of success. We have found that the degree of purification depends, to the greatest extent, on the original concentration; that is, the higher concentrations of store wastes are purified to a less higher degree than the lower.

Because of this, it has behooved many of the mills to tighten up and reduce their general losses; and we find now that, with modern mills, those losses are approaching an irreducible minimum.

We can get very high degrees of purification. There is one installation I know of that is now operating a degree of over 85 per cent purification by this method. This presumes, of course, that you have plenty of waste land not too near a community—of course, there is some overflow, but it isn't too intense—and that your topography is such that it does not involve too complicated pulping problems.

It is a fact, that if stored, it is a rather cumbersome means of doing the job. That is why we have been interested in finding out how this thing works, why it purifies itself. The early experiments have shown that the purification was due entirely to bacterial decomposition; that is, we took the waste and filtered it through a filter that strained the bugs out and found that the purification did not then take place. We took that as pretty good evidence that the bacteria were working it over.

Since then, we have tried various means of stimulating this bacterial activity. Recently, we have had some success by treating the raw waste, that is, the waste entering storage with some of the stored waste and with relatively small quantities of nitrogen salts. This work will continue in the hope that we can find a method that will be less cumbersome and less expensive than the storage method.

I would like to speak briefly also of the aquatic biology work. This, as Mr. Winget said, has been initiated previously in Wisconsin, in answer to complaints of several fish kills, none of which had been established as definitely due to the kraft mills. However, everyone knows that there can be substances present in kraft mill wastes that would kill fish or kill anybody, for that matter.

One of the first jobs is to isolate the specific substances which could be toxic, such as caustic soda, and soda ash in relatively high concentrations, and sulphides, hydrogen sulphide, and others in quite extremely toxic concentrations. However, in examination of the discharge of a number of mills and consideration of the dilution factor in the streams we found that toxic conditions did not occur in the stream, and in many cases, fish would even be at the outlet itself. This happened also in further experiments with the microorganisms upon which the fish depend for their survival.

You see, many of the fish become unresponsive to the toxic condition. That is why you don't kill the fish.

An interesting fact here was that the

microorganisms can withstand the same concentration of waste and the variable conditions as the fish themselves.

Now, in different parts of the country we have different species of fish, different degrees of sensitivity. Everybody always asks the question, how much of this will kill fish, and what condition here will affect the fish. No two fish, even of the same species, are exactly alike. Different species of fish can withstand various concentrations. Then also their environment plays a big part and their physiological activities. That is, we can have conditions due to discharge where the fish will survive also. They won't multiply. We can have others where they will dormant at the bottom and survive. They won't behave at all normally. That is why we have carried the work in aquatic biology on the West coast to determine how the salmon and trout and various other sensitive species will react, and why our work in aquatic biology is now outstanding in the South to determine just what requirements we are up against here.

I would like to conclude by telling you a little of the work on bleachery waste. As you know, the two factors that are most detrimental to a stream in bleachery waste are the color and the oxygen demand. As we do more bleaching and do more intensive bleaching this problem is becoming countrywide. Now, we find that in laboratory experiments, by treating bleachery waste with calcium hydroxide, that is, ordinary lime, high calcium lime and removing practically all of the color and about half or a little bit more, maybe 60 per cent of the oxygen demand of this bleachery waste—this treatment requires a considerable amount of lime, and to be successful would have to be incorporated in the normal lime recovery process of a mill. In other words, we would have to treat the waste with lime sludge and send it back to the mud filters and through the burning system. This is a problem that cannot be tackled further in the laboratory. That is, we burn the lime in the furnace. But what the reaction would be practically is another story. We are in the development phase of this problem with one of the southern mills where the whole process will be worked on a large scale to see how far we can go in this direction.

This section contains abstracts of papers presented before the Division of Cellulose Chemistry of the American Chemical Society meeting in Portland, Oregon, September 13-17, 1948.

The Oxidation of Basic Calcium Lignosulphonate With Metal Oxides

IRWIN A. PEARL
The Institute of Paper Chemistry

Previous work on the oxidation of vanillin to vanillic acid by means of alkali and mercuric oxide or silver oxide [Pearl, J. Am. Chem. Soc., 68, 429 (1946); 70, (June 1948)] led to an investigation of the reaction of lignin materials with alkali and these oxides, a reaction in which Lautsch et al. [Angew. Chem., 53, 450 (1940)] found little vanillin. In this paper, basic calcium lignosulphonate in alkaline solution was treated at atmospheric pressure with mercuric oxide and with silver oxide in the ratio of one unit lignin weight of 180 to 3 atoms of available oxygen.

The reaction mixtures were acidified and extracted with an immiscible solvent such as ether or benzene. The solvent was further extracted with 21 per cent sodium bisulphite, 8 per cent sodium bicarbonate, and 5 per cent sodium hydroxide solutions. Workup of these fractions and of the residual ether yielded bisulphite solubles, bicarbonate solubles, alkali-solubles, and neutrals in yields of approximately 50 per cent (based upon the original lignin). Vanillic acid was the principal constituent of the bicarbonate soluble fraction and was obtained in amounts of 20 to 30 per cent. The bisulphite-solubles consisted of vanillin and acetovanillone and the alkali-solubles of acetovanillone and guaiacol. In the case of the mercuric oxide oxidations, the alkali-solubles also contained much vanillin.

Initial sulphur dioxide acidification of the alkaline reaction mixture was necessary in the mercuric oxide oxidations in order to obtain mercury-free fractions. Otherwise, mercurated vanillin and mercurated lignin derivatives were obtained. These mercurated products were found to be useful as relatively nontoxic (to fish) slime control agents for paper mills.

When basic calcium lignosulphonate was oxidized with alkali and silver nitrate, it was found necessary to acidify the reaction mixture first with sulphur dioxide in order to prevent nitration of the products formed in the original oxidation reaction. Thus, 4-nitroguaniacol was isolated from an alkali-soluble fraction of such a reaction mixture acidified initially with sulphuric acid.

A procedure for the isolation of pure vanillic acid from the bicarbonate-soluble fraction of lignin oxidation mixtures based upon the solubility of vanillic acid in neutral lead acetate solution is described.

Alcohol from Sulphite Waste Liquor at Bellingham, Wash.

E. O. ERICSSON
Puget Sound Pulp & Timber Co.

Plant facilities and general operation of the alcohol plant of the Puget Sound Pulp & Timber Co. at Bellingham, Wash., are described. This plant constructed during the war is one of the several alcohol plants built to alleviate the war time shortage of alcohol. It is unique in being the only one utilizing as a raw material the sugar contained in sulphite waste liquor, which is the spent waste liquor from the process of producing sulphite wood pulp, the principal product of the company.

Commencing operation in March 1945, the plant produced alcohol for the Government's needs until the end of the war. Since that time the plant has continued uninterrupted operation at full capacity, thus making available locally for the first time in the Pacific Northwest industrial alcohol in large quantity. Present day output of the plant is 9500 gallons of 190 proof alcohol daily.

A Study of the Reaction Products of Lignin and Sodium Chlorite in Acid Solution

J. S. BARTON

In the digestion of wood with sodium chlorite and acetic acid, the lignin content of the original wood becomes almost completely soluble in the dilute acetic acid solution. Acidification with sulphuric acid precipitates a portion of the material and ether extraction of the filtrate gives other

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fractions. The precipitate has been separated into fractions, designated as chlorite lignin A and chlorite lignin B. The former has the formula $C_{20}H_{29}O_{14}Cl$, is a nearly white amorphous powder free of polysaccharides, and appears to contain two methoxyl groups, two carboxyl groups, two hydroxyl groups, and a chlorine atom per unit weight of 600. The latter has the formula $C_{21}H_{21}O_{12}Cl_3$ and appears to contain one methoxyl group, two carboxyl groups, and two chlorine atoms per unit weight of 553. These two compounds seem to be chemical entities. Ultraviolet absorption spectra of these materials do not exhibit the usual maxima at 280 mm. as is the case for other lignin preparations. The ether-soluble material contains fumaric, oxalic, and chloroacetic acids and a neutral crystalline wax. The reaction products from an isolated lignin (Indulin) differ somewhat from those obtained from wood in that they contain fewer methoxyl groups and chlorine atoms.

Functional Derivatives of Lignin Sulphonic Acid

C. M. RITTER
E. D. OLLEMAN
D. E. PENNINGTON
and
K. A. WRIGHT
University of Washington

A number of functional derivatives have been prepared from a lignin sulphonic acid, refined by quinolinium salt extraction with quinoline and proved chemically homogeneous by diffusion analysis. These substances, which can be considered definite chemical individuals, increase the range of conditions under which lignin sulphonic acid can be studied. Their methods of preparation, properties, and interrelations have definite bearing upon the hypotheses regarding the structure of lignin derivatives.

The hemi-methoxy lignin sulphonates and the per-methoxy lignin sulphonates prepared with diazomethane and dimethyl sulphate, respectively, are derived from lignin sulphonates having the composition $C_9H_{6.72}O_{1.21}(OCH_3)_{0.206}(SO_3)_{0.470}Na_{0.680}$. The hemi- and the per-methoxy lignin sulphonates have the following compositions respectively: $C_9H_{7.22}O_{1.80}(OCH_3)_{1.83}(SO_3NH_4)_{0.801}$ and $C_9H_{7.68}O_{2.17}(OCH_3)_{2.17}(SO_3NH_4)_{0.43}$.

The per-acetoxy lignin sulphonates have compositions corresponding to the formula $C_9H_{5.35}O_{2.56}(OCH_3)_{0.59}Ac_{1.21}(SO_3NH_4)_{0.680}$. Efforts to prepare acetyl derivatives of the per-methoxy lignin sulphonates have been unsuccessful; thus the extra oxygen appears not to be in hydroxyl groups. Per-methoxy lignin sulphonic acid salts show increased solubility in organic solvents and the N-methyl quinolinium salt is soluble in nitromethane.

Per-methoxy lignin sulphonic acid suspended in tetrahydrofurane is converted to per-methoxy lignin sulphonic acid methylester by reaction with diazomethane. This substance, which is soluble in tetrahydrofurane, dioxane, nitromethane, and chloroform, has the formula $C_9H_{7.35}O_{1.20}(OCH_3)_{2.14}(SO_3CH_3)_{0.43}$. The ultraviolet absorption spectrum of the methylester closely resembles the spectra of other lignum derivatives, indicating that few, if any, alterations in structure have occurred during the reactions leading to its formation. The relation between the derivatives and the structure of lignin sulphonic acid will be discussed.

Lignin Hydrogenation Products

ELWIN E. HARRIS
LEROME F. SAEMAN
and
CLARENCE B. BERGSTROM
Forest Products Laboratory

Two samples of lignin recovered from soda-process pulping liquors were hydrogenated in the continuous equipment of the U. S. Bureau of Mines, Pittsburgh, Pa. One was at 325 C. with copper-chromite catalyst, and the other at 400 C. with tin sulphide and iodoform. In both cases about 70 per cent of the lignin was converted into volatile products, including gas, water, hydrocarbons, methyl alcohol, ketones, cyclic alcohols, and phenolic compounds.

The lower temperature and copper chromite catalyst produced 14 per cent water, 8 per cent methanol, 8 per cent tar acids, 13.3 per cent oxygen compounds, 21.8 per cent unsaturated hydrocarbons, 2 per cent saturated hydrocarbons, 4 per cent gas, and 28 per cent heavy oil.

Catechols were removed from tar acids with lead acetate and appeared in about equal amounts as catechol, 4-methyl catechol, 4-ethyl catechol, and 4-tar acids. The non-catechol fraction contained phenol guaiacol, p-cresol, p-methyl-, ethyl-, and propyl-, 2-

methoxy phenols, and xylenols, besides several unidentified phenolic substances.

Neutral oxygen compounds were removed from the neutral oils remaining from alkaline extraction by treatment with anydrous magnesium chloride. The oxygen compound was recovered by decomposing the magnesium compound with water. These products represent 30 to 40 per cent of the neutral oils or 10 to 15 per cent of the lignin. Acetone, methyl ethyl ketone, cyclopentanone, and other ketones were among the products isolated.

The higher temperature produced similar products but in different amounts.

Substituted Styrenes from Lignin via Vanillin

B. B. CREAMER, S. COPPICK
American Viscose Corp.

MARCUS HOOK and E. C. JAHN
N. Y. State College of Forestry

This investigation is part of a research program to study the chemistry of known compounds which can be obtained readily from lignin. Vanillin is commercially produced from lignin and potentially large quantities could be produced. Vanillin was therefore selected as the first compound for study.

Monomeric 3-methoxy-4-acetoxy styrene was prepared in very high yields by the Perkin reaction on vanillin. This same monomer was also prepared by acetylation of 3-methyoxy-4-hydroxy styrene. The 3-methoxy-4-hydroxy styrene was prepared from vanillin by condensation with malonic acid. Hydrolysis of 3-methoxy-4-acetoxy styrene also gave the free hydroxy compound.

The 3-methoxy-4-acetoxy styrene readily polymerizes in the liquid phase, in solution and in emulsion. The preparation of poly-3-methoxy-4-acetoxy styrene makes possible the preparation of copolymers of these two compounds.

The acetoxy polymer is insoluble in alcohol and water, while the hydroxy polymer is soluble in alcohol and the sodium salt polymer is soluble in water. By varying the combinations of these polymers, copolymers having widely differing solubility characteristics can be prepared.

The Establishment of the Polymeric Nature of Lignin Sulfonic Acids

AARON E. MARKHAM
QUINTIN P. PENISTON
and
JOSEPH L. McCARTHY
University of Washington

The nondialyzable lignin sulphonic acids of sulphite waste liquor have been fractionated by precipitation of their barium salts from aqueous solution with ethanol. Ten fractions were obtained as precipitates and an eleventh from the residual solutions. Analysis of these fractions showed them to be very similar in chemical composition as represented, for example, by Fraction 4:

$C_9(OCH_3)_{0.92}(OH)_{0.17}(SO_3)_{0.42}{}^{(Ba)}_{2}{}_{0.11}H_{9.45}O_{3.11}$

Only phenolic hydroxyl, as estimated by a periodate oxidation procedure, is shown in the above formula. The degree of sulphonation however showed gradual increase with order of precipitation from 0.37 to 0.52 atom of sulphur for each nine carbon atoms. On recalculating the analytical data to a basis of anhydrous, sulphur-free, and ash-free lignin, the empirical composition of precipitated fractions is found to be substantially the same:

$C_{9.00}(OCH_3)_{0.88-0.91}(OH)_{0.16-0.20}H_{7.3-8.4}O_{1.9-2.3}$

The constancy of composition is confirmed by ultraviolet absorption data. Diffusion coefficients of the fractions are found to increase progressively in order of precipitation and indicate a progressive decrease in molecular weights over a wide range for the several fractions. These data are believed to establish the polymeric nature of lignin sulphonic acids. The analytical results are explained most simply, although not exclusively, by viewing the lignin investigated as a copolymer constructed of randomly distributed structural units I and II, present in proportions of about nine to one respectively.

Isolation and Characterization of Low Molecular Weight Lignin Sulphonic Acids

QUINTIN P. PENISTON
HILDA DANIELS AGAR
and
JOSEPH L. McCARTHY
University of Washington

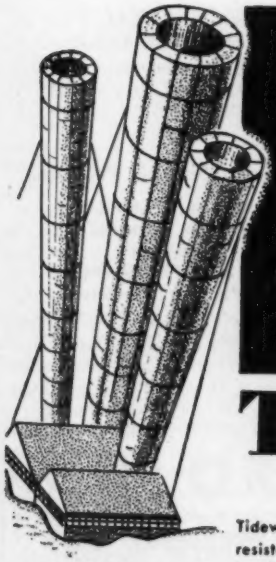
The dialyzable lignin sulphonic acids of sulphite waste liquor comprising 25 to 35 per cent of the total have been separated from other low molecular weight components of sulphite waste liquor by selective adsorption and elution from an anion exchange resin. Progress in the purification of these substances has been followed by chemical analysis and by a procedure of electrophoresis in gels developed for this purpose. The occurrence of a complex mixture of low molecular weight lignin sulphonic acids in the dialyzate is demonstrated.

The lowest molecular weight of these are found to be eluted from Duolite A-3 resin by sulphuric acid solution while the higher members of the series can apparently only be removed with strongly alkaline solutions. Electrophoresis patterns and diffusion coefficients for the lignin sulphonic acid fraction eluted with sulphuric acid solution show it to be of low average molecular weight (probably below 500) and nearly monodisperse. The characterization, in part, of this material is reported.

Preparation of Arylethynylcarbinols

E. T. CLAPPERTON
and
W. S. MacGREGOR
Department of Chemistry
University of Portland

The reaction of carbonyl compounds with sodium acetylide in liquid ammonia has met with varying success when applied to aromatic aldehydes. Benzaldehyde, O- and P-methoxybenzaldehydes yielded from 62 to 88 per cent of the corresponding acetylenic alcohols while p-chlorobenzaldehyde gave only 6 per cent and 4-ethoxy-3-methoxy-



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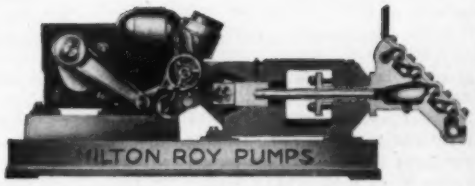

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benzaldehyde failed to react (Rutàn and May, *J. Am. Chem. Soc.*, 69, 2017, 1947).

In the interest of vanillin reactions the addition of sodium acetylide to vanillin, veratraldehyde, and 4-ethoxy-3-methoxybenzaldehyde was studied. All three reacted readily to give the corresponding ethynylcarbinols in excellent yield (77 to 91 per cent). The new carbinols were characterized by forming the acetyl, silver, and mercury derivatives.

When 0.05 mole of sodium acetylide was reacted with excess benzaldehyde and acetylene 0.07 mole of phenylethynylcarbinol was obtained (140 per cent based on sodium). The sodium salt of phenylethynylcarbinol thus appeared to react slowly with acetylene to form additional sodium acetylide as postulated earlier by Campbell, Campbell, and Eby (*J. Am. Chem. Soc.*, 60, 2882, 1938).

Native Lignin—Native Aspen Lignin

M. A. BUCHANAN
F. E. BRAUNS
and
R. L. LEAF, JR.
Institute of Paper Chemistry

A native lignin fraction has been isolated from aspen wood under conditions designed to prevent any changes in the lignin during its isolation and purification. This hardwood lignin contains 19.5 per cent methoxyl, 63.2 per cent carbon, and 5.9 per cent hydrogen. Treatment of the isolated native aspen lignin with 72 per cent sulphuric acid causes a loss in weight of about 10 per cent and increases the methoxyl content to 20.4 per cent which is in the range normally obtained for sulphuric acid lignins prepared directly from hardwoods. A unit of native aspen lignin containing six methoxyl groups has a unit weight of approximately 945. A unit of this size corresponds to an average composition of $C_{36}H_{36}O_{18}$, and contains six hydroxyl groups which can be methylated and acetylated. One of the hydroxyl groups is phenolic, at least one hydroxyl group per two units seems to be enolic, and the others are presumably aliphatic. The action of diazomethane, of methanol in the presence of hydrogen chloride, or of phenylhydrazine with isolated native aspen lignin does not introduce an integral number of groups into the lignin on the basis of the above unit. This suggests that either the true unit is a multiple of 945 or the native aspen lignin is not homogeneous. The absorption spectrum of native aspen lignin does not have the well-defined maximum at 280 mu characteristic of softwood lignins.

Ultraviolet Absorption Spectra of Sulphuric Acid Solutions of Wood Cellulose

O. GOLDSCHMID
and
D. W. BALKEMA
Rayonier, Inc.

Various methods for the colorimetric determination of lignin in wood cellulose are discussed, particularly a method recently published by Giertz. Ultraviolet absorption spectra of strong sulphuric acid solutions of wood celluloses, prepared according to the method of Giertz, have been studies in an attempt to utilize the powerful and characteristic ultraviolet absorption of lignin for its determination. Solutions of unbleached wood celluloses show the typical lignin spectrum; further study of the spectra reveals the rapid formation of hydroxymethyl furfural due to the action of the acid on the cellulose. By modifying the method of preparing the solutions, the rate of furfural formation decreases to an extent which makes possible the spectrometric determination of the lignin content of unbleached and partially bleached celluloses.

In order to understand the results obtained with highly bleached wood celluloses, the ultraviolet absorption spectra of similar solutions of lignin-free cotton cellulose after various treatments have been studied. Hydrolyzed, mercerized cotton cellulose shows an increased rate of hydroxymethyl furfural formation; the spectra of solutions of severely oxidized cotton cellulose show not only an increase in the rate of formation of the furfural band, but in addition reveal the presence of substances which strongly absorb in the far ultraviolet.

Ultraviolet spectroscopy permits the rapid determination of the lignin content of very small samples of partially bleached wood celluloses. As a method for determining residual lignin in highly bleached celluloses, the results obtained with such celluloses indicate interesting possibilities for the application of ultraviolet spectroscopy to the study of the hydrolysis and oxidation of cellulose.

Pulp and Paper Technology at Western Michigan College[1]

A. H. NADELMAN[2]

An act of the legislature of 1903 established the Western Michigan College under the presidency of Dwight B. Waldo. Successive land purchases have increased the original campus of twenty acres to one of two hundred and eighty acres. The enrollment grew from one hundred and sixteen students in 1904 to more than four thousand students during the last few years. Buildings were added, when needed. A generous building program is under way.

President Dwight B. Waldo, the first president of the College, tendered his resignation in 1936 and was succeeded by Dr. Paul V. Sangren who had been serving in the capacity of Dean of Administration.

Under Dr. Sangren's guidance a variety of curricula are offered leading to the degrees of Bachelor of Science, Bachelor of Arts, Bachelor of Music, to the conferment of a certificate or diploma, and to the completion of pre-professional training. Among the many educational opportunities offered by the Western Michigan College is the new curriculum in Pulp and Paper Technology, a four years' course leading to the degree of Bachelor of Science.

(1) Presented at the October 7, 1948, meeting of the Kalamazoo Valley Section of TAPPI.

(2) Head of the Curriculum, Professor of Pulp and Paper Technology, Western Michigan College of Education, Kalamazoo, Michigan.

Why does Western Michigan College offer this curriculum? In times of constant technological progress, industry, particularly our paper industry, needs men who have been thoroughly trained in technology. Nobody expressed the conditions leading to an unprecedented demand for technically trained men more eloquently than the author of the seventy-fifth anniversary report of a leading paper concern. Here are statements which describe conditions prevailing about forty years ago and I am quoting from the report issued by the Kimberly-Clark Company:

"Papermaking remained in most respects an art rather than a science. It was controlled not by measurements, instruments, and automatic controls as now, but rather by the skilled senses of the experienced papermaker.

"Papermakers did the job by eye, ear, nose and thumb. Dipping his forefinger in the furnish, sniffing it, and rubbing it with the thumb told such an expert whether the sheet would come off the dry end of the machine as the desired quality. He relied upon his vision and his judgment to achieve the shade of paper desired. He double checked the accuracy of his decisions about the earlier operations by crumpling a finished sheet in his fist to see how it felt, crinkling it close to his ear to hear its rattle, poking his finger through it for breaking strength, spitting on it to test its sizing, and peering through it to gauge its opacity.

"Today's paper mill men marvel that the old-timers could get such excellent results. But today's paper users could not use much of the old-time product, particularly printing papers, because its lack of uniformity would make trouble on modern high-speed, high precision presses."

There have been men with vision in our Michigan paper industry who did not only see the urgent need for more technically trained men, but who possessed the initiative to do something about it.

About two years ago, a few men with a background of training in technology investigated the possibilities for educational activities in pulp and paper technology in Kalamazoo. They approached Dr. Paul V. Sangren, president of Western Michigan College, and petitioned him to inaugurate such a curriculum.

After a series of preliminary conferences, a history making meeting was held on February 12, 1948, at the Park American Hotel in Kalamazoo. Representatives of nineteen paper companies and other concerns expressed their urgent desire to have training facilities in pulp and paper technology in Kalamazoo, and pledged co-operation with such an educational venture. Western Michigan College welcomed the co-operation of the mills and the idea of being of service to the paper industry. In addition, the Michigan Division of the American Pulp and Paper Mill Superintendents Association and the Kalamazoo Section of the Technical Association of the Pulp and Paper Industry expressed their determination to lend their assistance in every possible way.

As the result of the meeting, Ralph Hayward (Kalamazoo Vegetable Parchment Company) was appointed chairman of a

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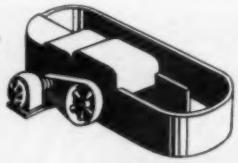

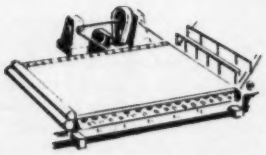

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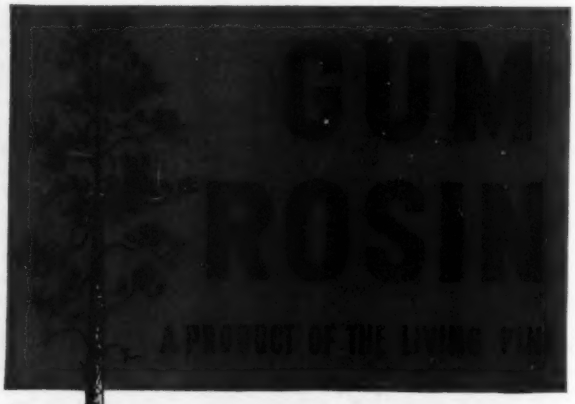

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body which nominated the members of the Industry Advisory Committee. E. E. Ludwig (Bermingham and Prosser) accepted the chairmanship and M. D. Bardeen (Lee Paper Company), Paul Bartholomew (Hawthorne Paper Company), Rudolf Germanson (Kalamazoo Vegetable Parchment Company), W. A. Kirkpatrick (Allied Paper Mills), A. L. Sherwood (Sutherland Paper Company), Dwight Stocker (Michigan Paper Company) agreed to serve as representatives of the paper industry. Dr. Deyo B. Fox, Director of Vocational Education, as well as Dr. Gerald Osborn, Head of the Department of Chemistry, expressed their willingness to represent the Western Michigan College. Thus a committee has been created which includes two members of the faculty of Western Michigan College, which is truly representative of the paper industry in the Kalamazoo valley, and which is under the chairmanship of a man who is pledged to act in the interest of the paper industry as a whole and not of one particular mill.

Neither the Industry Advisory Committee nor Western Michigan College wasted any time. Systematically and efficiently they worked to convert an idea into reality. The college allotted lecture room and laboratory space for the course, Dr. Osborn and Dr. Fox visited some universities which offer instruction in pulp and papermaking, the problem of adding personnel to the faculty for the new venture was solved and curriculum for four year's college training drafted and accepted.

The curriculum in pulp and paper technology includes in the first year, rhetoric, mathematics, general chemistry, mechanical drawing and orientation of pulp and paper technology. The last subject is designed to give the young student an outline of our industry and to prepare him for summer mill practice. One semester hour throughout the whole year has been deemed sufficient for that purpose.

The second year will be devoted to language and literature, calculus, mechanics, sound, heat, electricity and light, qualitative as well as quantitative analysis. Pulp technology and paper manufacture will be taught three hours a week. The textbook *The Manufacture of Pulp and Paper*, volumes three, four and five, will be used together with a selection from current literature and from bulletins furnished by some leading manufacturer of paper mill machinery and auxiliary equipment.

The third year will include language and literature, organic chemistry, elements of industrial chemistry, and sociology. Three hours per week will be devoted to laboratory courses in pulp and papermaking.

The fourth and final year will be devoted to physical chemistry, economics, laboratory courses, and lectures and a thesis on pulp and paper technology.

While the curriculum is still in a state of development as far as instruction in pulp and paper technology during the third and fourth year is concerned, we have reason to assume that laboratory courses on coloring, pulp purification and bleaching, deinking, pulp testing, paper testing, fiber microscopy and lecture courses on wood chemistry and plastics will be offered.

The entire curriculum provides for twenty to twenty-four semester hours of elective subject such as speech, German, engineering materials, engineering processing, electronics, electrical measurement, accounting, salesmanship, report writing, business law, and business administration.

The summer mill practice plan provides for actual work experiences during the summer in the pulp and paper industry. While only the work of two semesters is required we encourage the gaining of more diversified experience by working in paper mills during the third summer of the curriculum.

You may have noticed that Western Michigan College's curriculum is different in at least one respect from the curricula offered by other educational institutions. To start teaching pulp and paper technology during the freshman year, whereas some other colleges begin to offer instruction on our subject during the junior or the senior year. We feel that there is a definite advantage in teaching pulp and paper technology at an early stage, because we want our students to have a certain limited amount of knowledge of our industry when they start working in a paper mill after completion of the first college year.

The selection of students puts a grave responsibility on the faculty. Promise of scholarship as evidenced by good result of high school training is only one of the prerequisites. Another factor is that of human relationship. We endeavor to select men who will be able to do team work, as practised in industry, and so will be respected and

(Turn to page 1406)

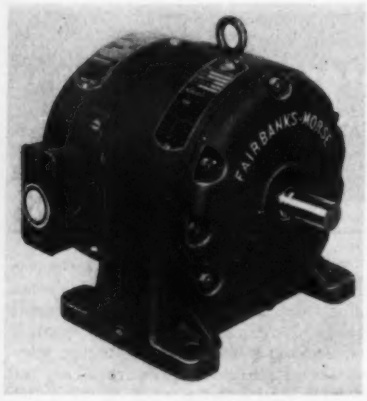
NEW EQUIPMENT AND SUPPLIES

Motorgear

The axial air gap motor, introduced some months ago by Fairbanks, Morse & Co., Chicago, Ill., is now available as a motor reducer. The main features of the axial air gap motor are space and weight reduction, the motor being less than half the size of the conventional type motor and weighing less by approximately one-third, yet retaining the necessary characteristics of sturdiness and power requirements.

These units are symmetrical in design with no separate right—or left-hand assemblies. They are available in ratings from ¾ to 10 hp. The motor also may be removed from the gear housing and run separately.

Another feature of this new motor gear is that the motor and gear shafts are parallel, with the centerline of the motor coinciding with the centerline of the low speed shaft. The motor shaft rotates on ball bearings, while the gear shafts are mounted on tapered roller bearings. The high speed



pinion, mounted on the motor shaft extension close to a double row ball bearing, reduced deflection of this overhung pinion to a negligible minimum. The bearings on the low speed shaft are over-size to allow for a generous amount of outboard pull from a sprocket, gear or pulley that may be mounted in this shaft.

Non-Plugging Filter Medium

A metallic filter medium, which the manufacturer promises will substantially reduce filtration cost, is being introduced by W. S. Rockwell Co., Fairfield, Conn. Known as *Neva-Clog,* this filter is applicable not only to all types of industrial filtration, but to all other processes involving the use of a medium which will pass liquids and retain solids. The construction is simple. Two sheets of metal of desired gauge are accurately perforated with holes of about .045 in diameter, spaced to provide about 120 psi. One of these sheets is superimposed on the other and so aligned that the unperforated portions of the top sheet block off the holes of the bottom sheets. The two sheets are then spot welded together on about 1-in centers, holding this adjustment permanently.

The staggered arrangement of the top and bottom holes is such that the edges of all holes in the top sheet are in very close proximity to the neighboring edges of holes in the bottom sheets. In effect, a passage for liquids is provided by each hole equivalent to the circumference of the hole times the distance between the two sheets. Liquids enter the holes of the upper sheet, turn at

right angles to pass between the top and bottom sheets, turn again at right angles and pass out through the bottom holes.

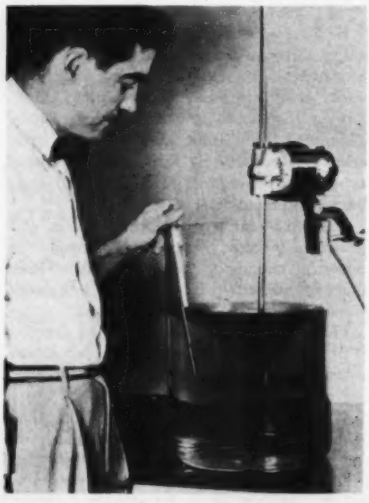
Solids are retained on the top sheet, either because they are too large to pass through the openings formed by this construction, or as a result of the formation of a filter bed on the top sheet which in turn prevents the passage of the finer solids. The filter bed may be formed by the solids in the slurry, or, where the nature of the solids requires the use of filter aids, it is formed by the filter air precoat.

Stirrer for Heavy Liquids

A new, heavy-duty stirrer, designed for use with thick, viscous preparations, has been designed by Eastern Industries, Inc., 296 Elm St., New Haven 6, Conn.

This *Eastern Model #8* is said to be compact, portable, efficient and economical to use in many applications. It is claimed to stir from 1 to 10 gallons of heavy fluid; will handle much larger quantities of thin mixtures.

The Eastern Model #8 is powered by a General Electric universal open frame motor rated at 1/15 hp for continuous duty a.c.



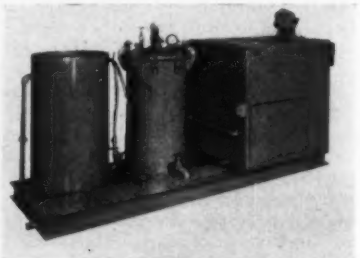
or d.c., 110 volts only. The motor is geared to produce a maximum countershaft speed of 840 rpm. The speed control—a permanently-installed rheostat type—permits variable speeds of 80 to 840 rpm. Reduction gears in the mechanism consist of a hardened worm and bronze gearing. The hardened gear shaft turns in special bronze composition bearings. Permanent oil seals are said to prevent any oil seepage.

Eastern states that the ½ in propeller shaft can be adjusted to length within a 30 in range by means of a hollow gear shaft and a collet chuck at the top of the gear case. Attached to this shaft is a two-blade, stamped stainless steel propeller 5½ in in diameter, held in place by a stainless steel cap nut.

The standard Eastern Model # 8 heavy duty stirrer is available with a screw clamp or ringstand handle mounting. It is supplied with a rubber covered cord, complete with a feed-through switch. For complete details on this and other electrical stirrers, write Eastern Industries, Inc., 296 Elm Street, New Haven 6, Conn.

Mogullizer for Fast Impregnation of Castings

A combination vacuum and pressure unit for eliminating porosity in pressure castings and developed for manufacturers who desire to perfectly seal castings without fixtures, has been developed by the Metallizing Company of America, 3520 West Caroll Avenue, Chicago, Ill. The new machine, *Model 3D Mogullizer,* is a high efficiency circulator for use with a special metallic impregnating solution known as Mogul Cast Seal Type B. Because the Mogullizer affords



fast impregnation of castings on a volume basis, the cost per casting is extremely low. Over three years of continuous field research and experimentation has gone into the development of the new Mogullizer, and all types of castings ranging from small bronze steam valves to fair-sized cast iron freon engine heads, outboard motor parts, carburetors, pressure castings of aluminum, bronze, stainless steel, and cast steel have been successfully impregnated.

The new machine consists of a vacuum pump, sealing tank, supply tank and agitator, heating elements, high pressure air connector, rinsing tank, and city water supply and drain connections. The top portion of the large, square tank is a 54-gallon supply container with two electric heating elements and an agitator with a ⅓ hp motor showing. To commence operation, equal amounts of water and Mogul Cast Seal B are placed in this tank. The thermostat is set at 190° and the mixture is heated. Meanwhile the lid on the pressure tank is

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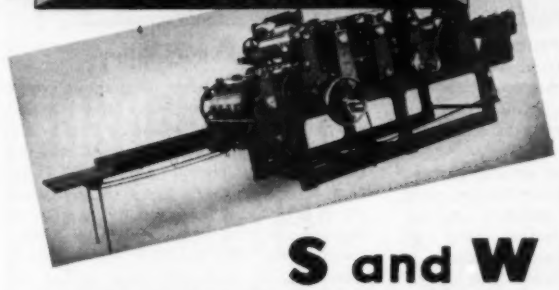

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For the bag industry — for increased production and lower costs. S & W Bottomers and Multi-wall Tubers for pasted and sewed bags increase production, reduce spoilage and lower unit costs. New exclusive, time-saving features make these top production machines highly desirable in the modern plant.

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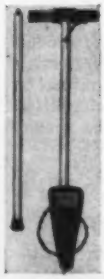

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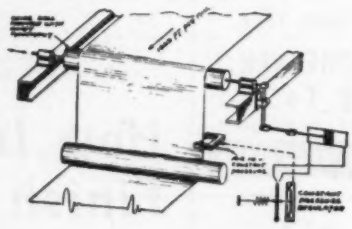
removed and the castings placed inside, the tank is closed and vacuum is drawn and held. The vacuum pump is in the lower part of the square tank. This pump line is shut off, air pressure of 90 pounds is put in the tank and held for 15 minutes, and the castings are then ready for removal from the sealing tank. They are placed into the tank on the left, where they are rinsed so that when the process is finished, there is no sign of any seal adhering to their surface.

The manufacturer points out that baskets and simple hoist and support arrangement built over the tanks for dropping and retrieving castings would further speed operation and provide maximum efficiency.

The company is currently offering to impregnate sample castings in their new machine at no cost for those interested in determining whether results would be practical for their sealing problems.

Edge Positioner

The edge position of any sheet-like material entering a process over rollers can be controlled within limits as narrow as +.05 in by simple mechanical means and without touching the sheet.



A new combination of standard control components, made by the Askania Regulator Co., 240 E. Ontario St., Chicago, Ill., with the addition of a pair of air nozzles, does the job. The nozzles are used to pass a narrow stream of air past one edge of the sheet. The air comes from one nozzle and is received by the other, which is connected to the diaphragm of a standard pressure regulator. The sheet moving between the air nozzles cuts a certain amount of the flow of air to give an impulse to the diaphragm. This impulse is transmitted to the diaphragm of the regulator which then supplies power to a cylinder to change the position of the sheet on the roller, either by pivoting the axle of the roller or by moving it from side to side. When the sheet moves to the right or left, it cuts off more or less of the air flow, changing the impulse on the regulator until a control position is reached.

In the case of an endless belt conveyor, which has a crowned roller, advantage is taken of the fact that a sheet will tend to center about the top of the crown. By pivoting the axle of the roller, the cylinder changes the position of the top of the crown in order to change the position of the sheet in response to the air flow impulse on the diaphragm of the regulator.

In the case of coating, the cylinder tilts the roller to move sheet to the right or left, in proportion to the change of impulse on the diaphragm.

The position of the air nozzles can be changed with a handwheel, in order to change the desired position of the sheet in relation to the center of the roll. When the air nozzles are moved to one side or the other, the sheet will follow them until the proper controlling impulse is received by the diaphragm of the pressure regulator.

Permanent Repair Alloy

A remarkable new low temperature bronze base permanent repair alloy that meets a real need in many industrial repair and maintenance applications is now available from The John Hewson Co., 70 Wall St., New York 5, N.Y. *Lo-Temp*, the permanent repair alloy, handles like putty at only 300 degrees and fuses with the metal surface under repair. Manufacturer states finished repair can be machined, filed, drilled and tapped, and that the low temperature required will not cause crystallization or distortion. It is claimed that Lo-Temp will not corrode, run, crumble, shrink, or dry out, and that it works with any metal except aluminum or its alloys.

Lo-Temp is not intended as a substitute for welding but meets the need for a strong metal permanent repair alloy that can be machined and handled at a low temperature. Permanent repairs may be made with an ordinary gasoline torch and a putty knife. It is recommended for saving valuable materials and production labor in many industries where defective or broken parts otherwise would have to be discarded. It is being used to repair pumps, scored cylinders, defective castings, cracked water jackets, steam and water pipes, etc.

Abrasive Cut-Off Machine

The Bridgeport Safety Emery Wheel Co., of Stratford, Conn., announces the development of a new, fully automatic abrasive cut-off machine designed for high speed cut-off of stock up to 2 inches square to lengths ranging from ¼ inch to 12 inches. Steel, brass, plastics, porcelain—practically all materials used in industry are cut with speed and accuracy on the new Bridgeport Model 51:

The head assembly which consists of an 18 inch abrasive cut-off wheel driven through Vee belts by a 10-hp motor is mounted on a rocker shaft running in Timken bearings and is actuated by a hydraulic cylinder which feeds the wheel in and out of the cut. The hydraulically operated feed mechanism is synchronized with the cutting head and automatically feeds a predetermined length of stock into position where it is gripped by a holding vise. After the cut has been completed the wheel withdraws, the feeder returns to normal position and the cycle is repeated automatically until the stock is exhausted or the machine is stopped by the operator.

Fully automatic operation, high production rate and cuts held to close tolerances are a few of the features of Bridgeport Model 51 which the manufacturers feel will fill an outstanding need in industry the country over.

Automatic Alarm System Added to Flow Indicators

Development of an automatic electric alarm system as an integral part of its line of flow indicators is announced by the Henszey Company, Watertown, Wis. The

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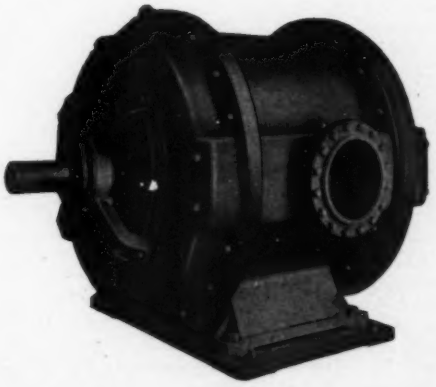

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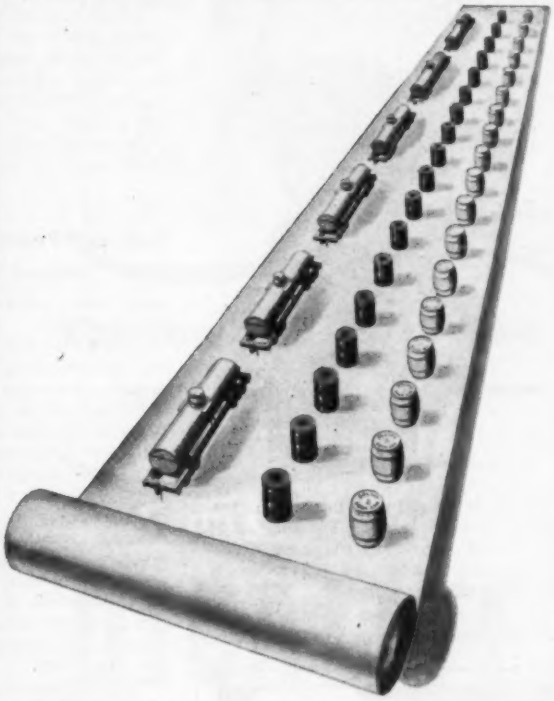

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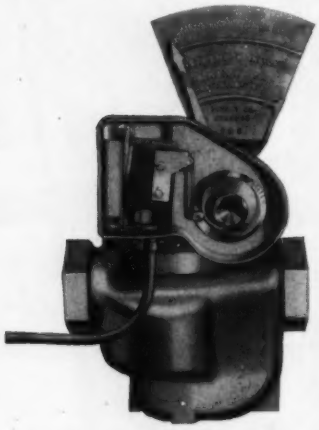
new units are being readied for production in sizes to meet all needs.

Although the Henszey Flow Indicator remains the same rugged and accurate instrument as in the past, the incorporation of the automatic alarm system adds to its operating function to enable workmen to know the rate of liquid flow more accurately than ever before. An electric alarm—either light



or sound—is set off when the high or low limits of flow are reached. The addition of this "electric watchman" eliminates detailing an extra man to the job constantly checking indicator readings.

The new alarm system consists of selectivity controls, a sensitive microswitch, and electric wires leading to an alarm. The pointers of the controls are set at the desired maximum and minimum rates of flow and locked with a knob. When the rate of flow varies beyond that set by the pointers, the microswitch closes contact and sets off an alarm, either a light or noise signal, to warn the operator.

A very accurate selectivity range is possible with the new alarm unit. The alarm may be set to operate a signal when the rate of flow exceeds limits or a fraction of a gallon per minute, or will operate at the widest range limits.

Despite the addition of the alarm system, visual reading of the dial is retained.

▼

Pulp and Paper Technology

(Continued from page 1401)

liked when industry absorbs them after their graduation.

Whether the members of the faculty can rely on their judgment in selecting our students, or whether we will avail ourselves of the help of the trained psychologists in Western Michigan College's Personnel and Guidance Department, will have to be seen. The splendid results of the Institute of Paper Chemistry in selecting its students, speak certainly in favor of the methods described recently by Dr. J. Edward Todd, assistant dean of that fine educational and research institution.

The members of the faculty used their own judgment when decisions had to be made as to admission of students to our new curriculum.

The freshman course "Orientation to Pulp and Paper Technology" is attended by fifteen students.

The sophomore course "Pulp Technology and Paper Manufacture" is presented to seven students.

As expected the majority of students are permanent residents of Michigan, we admitted, however, some students from Connecticut, Pennsylvania, Ohio, and even from as far as Pakistan.

It is interesting to find out the reasons for the individual student's enrollment in the course of pulp and paper technology. In many cases the student's father or a close relative is connected with our industry.

Considering the fact that the announcement of the new curriculum was delayed for reasons beyond the control of the College and the Advisory Committee, the results of the registration are encouraging.

In order to accommodate those students who wish to enroll at the start of the second semester on February 7, 1949, another freshman course on "Orientation to Pulp and Paper Technology" will start at that time, if the number of students justifies such action.

With a number of students in training and more expected to come, you will be interested in learning more about our facilities for lecture and laboratory courses.

A fine new science building is under construction at the western part of the campus. It will be ready for use in spring of 1949. The anticipated cost of the building and equipment will amount to about one and one half million dollars. The building will have sixty-eight thousand square feet of floor space. Two thirds of this floor space will be made available for chemistry, pulp and paper technology and physics laboratories and lecture halls.

The ground floor will house a pulp laboratory, a room with equipment for control of temperature and humidity intended for testing of paper, an analytical laboratory, a seminar room and office. In addition, the laboratories and lecture halls of the chemistry and physics department will be available, whenever required.

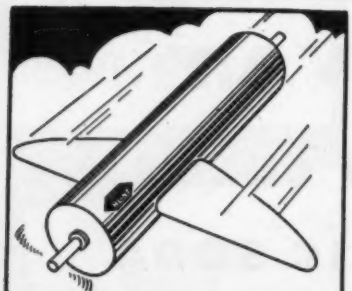
As to laboratory equipment, the college has acquired standard chemical apparatus and glass ware. A number of very good microscopes for instruction in fiber microscopy have arrived. Some sheetmaking and beating equipment has been offered by a manufacturer of those items as an outright gift. The Industry Advisory Committee will see to it that our laboratories are properly equipped.

Until spring 1949 we will use the old science building of the college which can accommodate the students of the new curriculum due to their limited number.

While the curriculum in Pulp and Paper Technology is a "going concern," to speak in terms of industry, some problems will have to be solved in order to give our students every opportunity to learn and to study successfully. Many of these problems will and can be solved by co-operation between the industry advisory committee and the college. There is an urgent need for a good collection of scientific and technical books and periodicals in our field, there is the necessity of establishing a correlation between labatory floor space available in our new building and equipment to be installed or secured for installation, there is the question of whether or not research should be limited to thesis of our seniors, there are the problems of summer employment for our students, of plant trips for our juniors and seniors and last but definitely not least of all, publicity. All these subjects will receive careful attention by the college, by the industry advisory committee or by subcommittees to be appointed by the advisory committee.

Another task for the college and the industry advisory committee is to give consideration to the problem of adult education in pulp and paper technology. We have received numerous inquiries on that subject and are interested in finding out whether there exists a genuine need for such a service. If that is the case, appropriate steps will be taken to serve industry and its members by offering evening classes when the new building is available.

Our work as educators would be incomplete if we would limit instruction to the subjects of science, or even to the narrower field of pulp and paper technology. In order to comply with the established philosophy of Western Michigan College, the members of the teaching staff are pledged to stress the psychology of human growth and development, to take an active interest in the well-being of each of our students, to act as counselors to the students and to give them advice in matters pertaining to their curriculum as well as to their personal problems. By doing so, the staff of Western Michigan College strives to help the individual student in his development to become a useful member of a co-operative democratic society.



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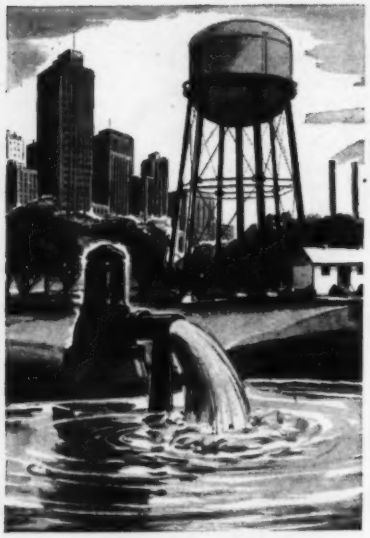

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in American and foreign press.

The Hydroscope

This is a simple instrument for measuring the strength of paper when wet or moist. The apparatus consists of a glass cylinder with a centrally perforated metal cover, through which passes a metal rod at the end of which is a clamp that holds the upper end of the paper test strip. To the lower end of the sample is attached a suitable clamp to which a 250 or 100 gram weight can be attached. Metal fittings are made of brass. The test is carried out at 20 C. either in air or 100% relative humidity or by rapid and complete immersion of the strip in water.

In either case the time is accurately clocked between the point of lowering of the strip into water or moist air and the final rupture of the strip. This is a measure of its tensile strength. Elongation prior to rupture may be measured in the same apparatus. In addition to water, salt solutions could also be used. Details of the apparatus are shown in sketches. August Noll. *Wochbl. Papierfabr.* 76, No. 6, 140-1 (1948) (In German).

Electrical Resistance of Presspan (Insulating Board)

The dielectric strength (in air) of presspan is discussed briefly, and data are given for breakdown voltages, which increase with an increase in the degree Schopper Riegler and also with increasing unit weight of the board. There is also a slight increase with the number of layers of paper used per mm. thickness of the board. The relationship between hot transformer oil absorption by means of the presspan and the density of the board is shown. The principal requirements of a satisfactory presspan to be used in transformer construction are: maximum heat stability and high dielectric strength under oil, a definite oil-absorptive capacity and the lowest possible ash content. Heinrich Mory, *Das Papier* 2, 178-81 (1948) (In German).

Copper Pyrites in Production of Sulphite Cooking Liquor

The roasting of chalcopyrite (copper pyrites) should be so carried out that the minimum amount of sulphur trioxide is formed. In a seven compartment furnace with two rabble arms for each compartment and handling charges of 3600 to 4000 kilos of pyrites *per diem*, the temperature in the third compartment was held at about 700 deg. C when the ore contained about 34% sulphur, 32% iron and 28% copper and when smaller amounts of lead, nickel, zinc, arsenic, cobalt, antimony and lime were present. When the ore contained about 47% sulphur, the roasting temperature was raised to 850 deg. The resulting gases were passed at 240 deg. via a short tube through the electrical fields of two Lurgi precipitating chambers and subjected to a pulsating current of 48,000 volts thus precipitating in fine dust-like form about 3% of the weight of the original charge.

After passing the gases through a Lurgi cooling system, the gas contained about 5.5-6% sulphur dioxide and about 2.5-3% sulphur trioxide. The residue after roasting amounted to 81% of the original ore and still retained 3.5-3.8% sulphur and 28-30% copper, a part of which was in the form of copper sulphate. It was found best to store this residue under shelter so as to obviate leaching losses during weathering. Technological implications of roasting the ore are briefly outlined. Ott Wurz and E. Wurz, *Das Papier* 2, No. 9, 190-1 (1948) (in German).

Cellulose From the Standpoint of Its Use in Papermaking

The author takes up the various theories that have been developed to explain hydration in the beater, and follows this discussion by giving experimental data supplied by various French laboratories under the general direction of *La Commission Technique de la Papeterie* and *La Conference Periodique de la Cellulose.*

The following tests were made both on a bleached sulphite pulp (I) and on cotton linters (II)—copper no. before and after beating to 80 deg. Schopper Riegler (3.01 and 2.98 respectively for I and 0.24 and 0.27 for II) and alpha-cellulose (83.7 and 83.9 for I and 98.8 and 99.1% for II).

It is evident that these figures are not affected by beating. Whenever beating led to extreme cornification, the pulp samples were disintegrated in a laboratory apparatus carrying a helix with 4 blades and operating at 8000 rpm. When *II* was beaten from 15 deg. S.R. to 85 deg. there was only a slight drop in d.p. (from 1430 to 1400). However, there were marked differences in the strength properties of I after beating depending on whether a Lampen mill (III) or a porcelain jar (IV) (containing no pebbles) was used. III operated at 16,000 rpm whereas IV rotated at 150 rpm.

In either case the final deg. S.R. was 56, but IV required 150 hours to reach this point. With III and IV respectively, the following pulp properties were noted for I—breaking length 4330 and 5150; burst 33 and 45; tear 26 and 59; folding endurance 72 and 6990 and porosity 0.03 and 0.067. The marked advantage of using IV (despite its impractability) is evident and the pulp properties are confirmed by photomicrographs which show extensive fiber degradation when III was used.

In the case of Scots pine, springwood fibers are the more plastic and contribute the most to tensile strength and fold, where-

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as the summerwood contributes most to tear resistance. Of all the methods used in determining swelling the centrifugation method (Cf. G. Jayme, *Chem. Abstracts,* 40, 3898) was the only suitable one. The method used in France is fully described. Whereas (in the case of II) the maximum deg. S.R. (83) was reached with a sharp break after 12 hours, the water retention of this same pulp increased up to 25 hours beating followed by a gradual falling off.

When beating was carried out in alcohol or carbon tetrachloride neither swelling nor fibrillation were noted, but the fibers were injured by cutting. When an alcohol-water system was used, the difficulties in hydration increased with increasing concentrations of alcohol (above 70%). The influence of temperature on hydration was marked. In general the lower the temperature in the beater, the more rapidly was a definite degree of hydration reached. The maximum breaking length was developed by beating I at 30 deg. for about 2 hours. Folding endurance and burst decreased with increasing temperature of beating, but tear resistance increased. Pulp that had been beaten at 15 degrees was kept at various temperatures (ranging from 15 to 100 deg.) for 2 hours. With the exception of tear, all strength properties diministed with rising temperatures, and this was most marked in the case of I. Photomicrographs show that fibers have undergone changes with temperature but that between 18 and 60 deg. such changes are reversible. They are probably irreversible above 70 deg.

By using buffered solutions, the influence of varying pH (3, 8, and 10) on I and on a kraft pulp was studied. The kraft pulp was the more sensitive to an acid medium whereas *I* was more sensitive to an alkaline medium. This influence of *p*H is not incompatible with the hypothesis that a colloidal film is formed during beating. Various additions to the beater were made to improve the so called "water film contact" by lowering the surface tension and increasing the rate of beating. These additives (for which no details are given) proved unsatisfactory.

By using the "beater liquors" of one operation in subsequent beating experiments, it was possible to increase the speed of hydration somewhat without loss of pulp quality. However, after a third such operation, there was no further gain in hydration rate. Whereas lignin interferes with hydration, pentosans react favorably, and by the addition of 1-5% pentosan the speed of hydration is accelerated. This was also found to be true for certain mucilages, commercial gums, etc., but no experimental details are given.

That hydroxyl groups are essential to hydration was shown by the cautious nitration of *II*. The products thus formed were neither fibrillated not hydrated in water nor did they give a paper sheet. However, there was a slight swelling of the nitration product in alcohol, and actually there was a slight rise in deg. Schopper Riegler on beating. Desmaroux' theory of beating is discussed. He assumes that by fibrillation in the beater, hydroxyl groups of the cellulose are "freed" and became accessible to water which is then "fixed." On drying the hydroxyl groups lose water and "saturate each other" in an irreversible reaction, which is coupled with cornification. R. Renaud. *Bull. assoc. tech, in. papetiere 2,* 98-116 (1948) (In French).

Neutralization Temperatures and Alcohol Yields from Sulphite Waste Liquors

The authors have studied the effects of varying the temperature of neutralization of a sulphite waste liquor on the alcohol yields resulting after fermentation. These temperatures ranged from 20 deg. up to 130 deg. C., and it was found that the highest alcohol yields were obtained when the neutralization temperature was about 95-100 deg. provided the *p*H was kept at about 5.3. When this temperature was used, liquors were easily clarified. Otto Wurz and H. Worscha. *Papier Fabr. Wochenbl. Papierfabr.* Dec. 1944, 373-5 (In German).

The Sulphur Balance in Sulphite Waste Liquor

The author found earlier that lignosulphonic acids from sulphite waste liquors contained more sulphur than would be accounted for by the sulphonic acid groups. Evidently this "excess sulphur" finds its genesis in the organic sulphur groups (other than sulphonic acids) which are formed by the action of the thiosulphate originating during the sulphite cook. This is evidenced by conductometric and potentiometric titrations. Two lignosulphonic acids (one with a sulphur content of 5.8% and the other containing 5.1% sulphur) both showed an excess of about 1% sulphur. Inasmuch as no inorganic sulphur compounds were present in these preparations, the excess sulphur must be bound to the organic substance, but no indication is given regarding the form in which this excess sulphur is present. Olof Samuelson, *Svensk Kem. Tid.* 60, No. 6, 128-30 (1948) through *B.I.P. Chem.* 19, No. 1, 51 (1948). (The original is in English.)

Determination of Alpha-Cellulose in Unbleached Pulps

The author has determined alpha-cellulose in kraft and sulphite (unbleached) pulps by the usual TAPPI procedure (203 m-44) and then by prechloriting in accordance with the directions given by Cundy and Beck (*Paper Trade J.* 124, No. 18, 36 (1947). The two methods give divergent results and the author concludes that the Cundy-Beck method (with slight modifications) is the better one. The results by this method are lower and more reliable. In his modification the author uses 5 g. pulp suspended in 500 cc. of a 3% sodium chlorite solution brought to a *p*H of 5 by means of hydrochloric acid. The suspension is heated 2 hours under reflux at 70-80 deg. The alphacellulose in the delignified residue is then determined by the usual procedure for bleached pulps. R. Lapèze. *Bull. Assoc. Tech. Ind. Papetiere* 2, 94-8 (1948). (In French).

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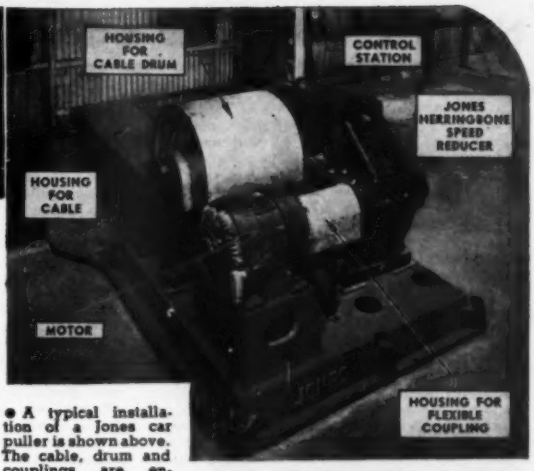

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New Catalogues and Publications

Allis-Chalmers Mfg. Co., S. 70th St., Milwaukee, Wis.—Two distinct types of chip screens—Low-Head and Ripl-Flo—for the pulp and paper industry are described in a new eight-page bulletin just released. Dimensions, construction and special engineering features are also included. As for Bulletin No. 07B6353A, "Allis-Chalmers Chip Screens for the Pulp and Paper Industry." Also released by this company is Number 10 of a series of engineering bulletins, which discusses the identification and prevention of steam turbine blade deposits and boiler water conditioning to prevent such deposits. It describes the X-ray diffraction method employed by the company for identification purposes and the results obtained. Listed in tables are the partial chemical analyses of deposits containing sodium disilicate; occurrence data on compounds found; composition of turbine deposits from turbines operating at various throttle pressures and temperatures, and comparison of compounds found in turbine blade deposits with boiler operating pressures. Copies of this 16-page bulletin, No. 28B7030, "Identification and Prevention of Steam Turbine Blade Deposits," may be obtained by writing to the above address.

Allegheny Steel Band Company, Box 716, Pittsburgh, Pa.—Recently published by this company is a six-page brochure describing this company's new line of "Steelband" products, including steelband; tensioners; sealers, and accessories for handling all types of packages, bales, boxes, bundles and pallets, as well as the lightweight Bandwagons for carrying steelband and tools.

American Car and Foundry Co., Valve Division, 30 Church St., New York 8, N. Y.—In Catalogue No. 4, issued by this company, are shown their ACF Lubricated Plug Valves, particularly suited for water, air, vacuum, acids, caustic solutions, chemicals, etc. In addition to numerous photos and diagrams, there are tables showing test pressures and working pressure ratings, also flange dimensions and drilling templates.

Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9, Ill.—The tenth edition of its pocket-size or junior catalogue, No. 487, has just been issued by this company. It contains illustrations and comprehensive information on the company's entire line of materials handling equipment, which include various types of hand, hydraulic and electric trucks, lifting systems, skids, etc.

W. H. and L. D. Betz, Philadelphia 24, Pa.—Available on request to this company is a 12-page article, "Corrosion: Its Effect in Boiler Systems." The corrosive effects of oxygen, carbon dioxide, ammonia, hydrogen sulfide, acidity and physical factors are evaluated. There are numerous illustrations, graphs and tables to aid in understanding the article. Ask for Technical Paper No. 111.

The Brown Instrument Company, Division of Minneapolis-Honeywell Regulator Co. Philadelphia 44, Pa.—Featured in the new 43-page catalogue published by this company are *p*H and conductivity controls and their application to different industrial processes, such as the making of pulp and paper. Also included is a discussion of the fundamentals of *p*H, oxidation-reduction potential and conductivity, and description of various instruments such as the Electronik Potentiometer, Flow Electrode assembly, the Beckman pH amplifier, as well as electrodes, conductivity cells, control valves, motors and pneumatic control accessories. Fully illustrated with photos and schematic drawings, it also has a partial list of circular and strip charts and scales and dimensional diagrams of *p*H equipment. Ask for Catalogue No. 15-12. Also available is Catalogue No. 7000, "Pressure and Vacuum Gauges, Indicating, Recording, Controlling." The 31 pages are well illustrated.

Burrell Technical Supply Co., 1942 Fifth Ave., Pittsburgh 19, Pa.—In Bulletin No. 213 issued by this company, are described their portable gas analyzers for control engineers and laboratory technicians.

Dings Magnetic Separator Co., 4740 W. McGeogh Ave., Milwaukee 14, Wis.—A complete description of the features and applications of electromagnetic pulleys and Alnico Magnetic Perma-Pulleys for automatic separation of ferrous and non-ferrous materials is given in the two new eight-page catalogues recently published by this company. They were prepared as a ready guide for magnetic separator users to help determine the type and size of magnetic pulley most suitable for their special requirements. Catalogue C-1001A describes the purposes, operation principles and advantages of electromagnetic pulleys. It is illustrated with actual photographs of installations of these pulleys, as in paper mills, for removal of iron from chips and wastepaper. Complete capacity and dimension tables are given for pulleys ranging in sizes from 12" x 12" to 48" x 60". In Catalogue C-1007A, are detailed the features of the new Perma-Pulley. A detailed explanation is given of the operating principles, and the advantages of nonelectric construction are listed. Complete specifications, capacities and dimensions are given for 8" x 8" to 30" x 60" Perma-Pulleys, which are made in 76 standard sizes, with shaft diameters to suit any requirement. A section of each catalogue, "How to Select a Magnetic Pulley," provides ready information on proper size and type of pulley for each requirement.

Downingtown Mfg. Co., Downingtown, Pa.—In attractive bulletin, No. 748, on its Downingtown-Wiener "Pressure" Refiner is now available from this company. A photograph of an actual installation of such refiners, photomicrographs showing groundwood screening after passing through this refiner, as compared with other equipment, and blue print of the machine, make this bulletin unusually interesting.

Electric Machinery Mfg. Co., Minneapolis 13, Minn.—Now available for engineering files is a new 20-page pocket size booklet, No. 200-Tec-1077, "Power Factor and What to Do About It." It explains the essentials of power factor in industrial plants; gives a digest of power factor calculation, tells why low power factor should be corrected, and how it can be done.

Fiber-Products Laboratory, Springfield, O.—An interesting pictorial folder which describes the functions of this laboratory is available. The laboratory is maintained to serve manufacturers of groundwood, chemicals pulps, semi-chemical pulp, paper, fiberboard, wallboard, hard board and similar products.

B. F. Goodrich Company, Akron, Ohio.—A revised catalogue section, No. 9160, is now available from this company. It describes the range of the company's adhesives and their applications; gives classifications of various types of rubber cements and service requirements, and lists different products. Data on standard containers is included.

Hardinge Company, Inc., York, Pa.—A description of the automatic backwash rapid sand filter made by this company is given in Bulletin No. 46. A page is devoted to paper mill applications for this filter.

Noble & Wood Company, Hoosick Falls, N. Y.—An attractive booklet issued by this company indicates and illustrates, with photoes and diagrams, many of the applications for their propellers. Information is also included on their extractor ring, modern breaker unit, and cast iron tanks, propeller equipped.

Northern Equipment Co., Erie, Pa.—A bulletin recently released by this company is descriptive of the boiler water level control at the Blackhawk Generating Station of the Wisconsin Power and Light Company. It is illustrated with photos, schematic layouts and sectional views. The booklet also contains information on Copes feed water regulators and accessories made by this company. Ask for Bulletin No. 487.

Pittsburgh Plate Glass Co., Columbia Chemical Division, Fifth Ave. at Bellefield, Pittsburgh 13, Pa.—A new 72-page technical manual, "Chlorine," attractively made up in black and green, is now available. This is the second of a series, and follows the Columbia Caustic Soda manual, published in 1947. It contains charts, diagrams and photographs showing the production and handling of chlorine and several of its end-products, and is intended for the use of operators, technicians, buyers and executives. Opening with a short history of the growth of the industry, a detailed discussion is given of the methods of manufacture, handling and unloading. Consideration is given to safety precautions, shipping, equipment and construction materials. The Technical Data section contains a minute study of the properties of chlorine, the preparation and analyses of several bleach liquors and detailed convention information. Requests for this manual should be made on the company letterhead.

H. K. Porter Co., Inc., 1932 Oliver Bldg., Pittsburgh 22, Pa.—Announced by this company is the first edition of its new lubricated plug valve catalogue. The 16 pages are fully illustrated, and include dimensional drawings, tables and descriptive matter. A full-page cross-section of the valve is featured, and various tables give information on dimensions, list prices, etc. Requests should be sent to the H. K. Porter Company, Inc., 700 W. 66th Place, Chicago 38, Ill.

Joseph T. Ryerson & Son, Inc., P. O. Box 8000-A, Chicago 80, Ill.—In the new, eight-page bulletin on Cold Finished Steel Bars issued by this company will be found a description of the finishing process, guide to selection, AISI and SAE standard steel compositions, table of average mechanical properties, and a condensed listing of the analyses, finishes and alloys carried in stock. A copy may be obtained by writing to the above address, or to other plants and sales offices.

Schutte and Koerting Company, 12th and Thompson Sts., Philadelphia 22, Pa.—The complete line of SK Steam Jet Exhausters and Compressors made by this company for use in connection with pump priming, exhausting, evacuating, cleaning, transporting and agitating liquids and gases, is described in their new bulletin, 4-E. Extensive use is made of tables, charts and drawings, to show the construction and operation of the exhausters, as well as sizes, dimensions and capacities. Typical applications are illustrated with colored diagrams.

Shartle Brothers Machine Co., Middletown, Ohio.—Now available from this company is Bulletin 3-SB, describes the Selectrap, which used with a disintregrator, salvages bundles of partially slushed fiber as well as fiber adhering to match sticks, etc. Selectraps are built in two sizes, with maximum capacities for 75 and 150 ton systems respectively. Request for bulletin should be addressed to Hayden A. Taylor, advertising manager.

Thwing-Albert Instrument Co., Penn St. and Pulaski Ave., Philadelphia 44, Pa.—Of special interest to the papermaker will be Leaflet P-480, issued by this company, showing line of paper-testing instruments.

Books

Pigments for Paper Coating—This book, the seventh in the series of monographs of the Technical Association of the Pulp and Paper Industry has just been issued. It was prepared under the direction of the TAPPI Coating Committee, Werner Kaufman, Kupfer Bros. Co., chairman; and the Pigments Subcommittee, W. R. Willets, Development Laborataory, Titanium Pigment Corp., chairman. Among the chapters included are the following: Barium Sulphate Pigments, by W. R. Willets; Calcium Carbonate, by Arthur M. Brooks, Raffold Process Corp.; Calcium Sulphite, by Gerald Haywood, West Virginia Pulp & Paper Co.; Paper Coating Clays, by S. C. Lyons, Georgia Kaolin Co.; Diatomaceous Silica, by C. J. O'Neil, Celite Div., Johns-Manville Sales Corp.; Luminescent Pigments, by V. A. Belcher, The New Jersey Zinc Co.; Satin White, by Edwin Sutermeister, S. D. Warren Co.; Talc in Coated Paper, by R. F. Blount, Hampden Glazed Paper & Card Co.; Titanium Pigments, by W. R. Willets and R. T. Bingham, Technical Association of the Pulp and Paper Industry; and Zinc Sulphide and Zinc Oxide Pigments, by V. A. Belcher. In addition, a large number of individuals contributed information for this publication and served as a board of editorial review. Copies are available from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd St., New York 17, N. Y. Price $5.00 per copy ($6.00 per copy outside the U.S.A.).

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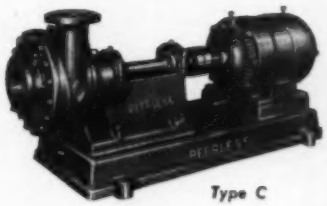

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TYPE C ENCLOSED IMPELLER

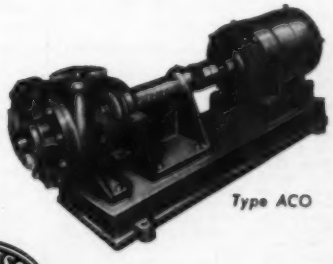
Designed to handle clear liquids which can be of corrosive nature. Single-stage, single-end suction design; range of capacities from 10 to 1200 g.p.m.; heads up to 231 feet; maximum working pressure of 150 lbs.

TYPE CO OPEN IMPELLER

Utilizes an open impeller to permit pumping of fluids up to 750° F with solids in suspension, brines, sludges, etc. Capacities from 10 to 1200 g.p.m.; heads 231 feet; working capacity of 150 lbs. All forms of drive. Both of the above pumps are described in Bulletin 810.

TYPE ACO FOR ACIDS AND CAUSTICS

Especially designed to pump caustics and acids. Handles fluids up to 800 g.p.m.; heads to 231 feet; maximum working pressure of 150 lbs. Temperatures should not exceed 300° F. Described in Bulletin D-2400.



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CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.	
Blue Overalls	7.75	to 8.00
Corduroy, Men's	6.00	to 6.25
Corduroy, Ladies'	6.00	to 6.25
Washables, No. 1	4.75	to 5.00
Percales	7.00	to 7.25
Light Prints, No 1	6.75	to 7.00
Khaki Cuttings—		
Bleachable	6.50	to 6.75
Unbleachable	5.75	to 6.00
New White Canvas	11.50	to 12.00
New Mixed Blacks	5.25	to 5.50
Canton Flannels, Bleached	11.00	to 11.50
Shirt Cuttings—		
New White No. 1	11.00	to 11.50
White Shrunk	10.00	to 10.50
Silesias No. 1	8.50	to 9.00
New Unbleached	11.25	to 11.75
Fancy	6.25	to 6.50
Linen Cuttings—		
American	8.00	to 8.50
White	14.50	to 15.50
Grey	13.50	to 14.50

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.	
Roofing—		
No. 1	1.35	to 1.40
No. 2	1.25	to 1.30
No. 3 and No. 4	1.05	to 1.15
Twos and Blues—		
Repacked	3.00	to 3.25
Thirds and Blues—		
Repacked	2.85	to 3.00
Miscellaneous	2.25	to 2.50
Whites, No. 1—		
Repacked	4.75	to 5.00
Miscellaneous	4.00	to 4.25
White, No. 2—		
Repacked	3.50	to 3.75
Miscellaneous	2.75	to 3.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.	
New Dark Cuttings	Nominal	
New Mixed Cuttings		
New Light Silesias		
Light Flannelettes		
Unbleached Cuttings		
New White Cuttings		
New Light Oxfords		
New Light Prints		

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.	
No. 1 White Linens	Nominal	
No. 2 White Linens		
No. 3 White Linens		
No. 4 White Linens		
No. 1 White Cottons		
No. 2 White Cottons		
No. 3 White Cottons		
No. 4 White Cottons		
Extra Light Prints		
Ord. Light Prints		
Med. Light Prints		
Dutch Blue Cottons		
French Blue Cottons		
French Blue Linens		
Checks and Blues		
Linsey Garments		
Dark Cottons		
Old Shopperies		

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.	
Gunny No. 1—		
Foreign	Nominal	
Domestic	8.00	to 8.50
Wool Tares—		
Light	8.00	to 8.25
Heavy	8.50	to 8.75
No. 1 Scrap Bagging	7.25	to 7.75
Manila Rope—		
No. 1 large	6.00	to 6.25
No. 1 small	5.00	to 5.25
Sisal Rope—		
No. 1 large	5.50	to 5.75
No. 1 small	5.00	to 5.25
New Burlap Cuttings	8.00	to 8.50
Jute Threads—		
Foreign (Nom.)	6.50	to 7.00
Domestic	6.00	to 6.50
Strings—		
No. 1 sisal	5.00	to 5.25
No. 2 sisal	4.50	to 4.75
Soft jute	4.25	to 4.50
Mixed	2.50	to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton	
Shavings—		
Hard Whit- Env. Cuts	100.00	to 110.00
Hard White, No. 1	80.00	to 85.00
Soft White No. 1	65.00	to 70.00
Soft White, One-cut	90.00	to 95.00
Soft White, Misc.	45.00	to 50.00
Fly Leaf, No. 1	45.00	to 50.00
Fly Leaf, Woody, No. 1	35.00	to 40.00
No. 2 Mixed Col. Woody	25.00	to 27.50
Flat Stock—		
No. 1 Heavy Books and Magazines	21.00	to 22.00
Mixed Books	16.00	to 17.00
Ledger Stock—		
No. 1 White	50.00	to 55.00
No. 1 Mixed (Colored)	37.50	to 40.00
Manilas—		
New Env. Cuttings	60.00	to 65.00
New Env. Cuts, One-Cut	–	
Extra Manilas	–	
Manila Tab Cards, Free of Ground Wood	60.00	to 65.00
Colored Manila Tab Cards	40.00	to 45.00
Kraft—		
New Envelope Cuttings	65.00	to 70.00
Tripled Sorted No. 1 100%	35.00	to 40.00
New 100% Cor. Cuts	35.00	to 40.00
No. 1 Old Assorted	25.00	to 27.50
News—		
White Blank	70.00	to 75.00
Overissue	18.00	to 19.00
No. 1 Baled	14.00	to 15.00
Old Corrugated Containers	14.00	to 15.00
New Jute Corrugated Cuts	20.00	to 21.00
Mill Wrappers	9.00	to 10.00
Box Board Chips	7.00	to 8.00
No. 1 Mixed Paper	7.00	to 8.00

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—		
Lump, cwt.	4.05—	
Ground, cwt.	3.80—	
Powdered, cwt.	4.20—	
Blanc Fixe—		
Pulp, bulk, ton	77.50—	
Dry, barrels	85.00—	
Bleaching Powder—		
Drums, cwt.	3.25	to 4.25
Casein (Domestic Standard)		
20-30 mesh (bags), lb.		
80-100 mesh (bags), lb.	29.00	to 31.00
Argentine, lb.	26.00	to 27.00
China Clay—		
Domestic Filler Bulk (mine) ton	10.00	to 15.00
Domestic Coating Bulk (mine) ton	15.00	to 25.00
Imported (ship side) Bulk (lump) ton	22.00	to 30.00
Chlorine—		
Tank cars (wks) cwt.	2.40	to 2.70
Gelatine (silicin), lb.	1.25	to 1.35
Glye. (C.P.) drums, lb.	.39½	to .40
Litharge, powd., bbl. lb.	.21¼	to .22
Rosin (Gum)—		
New York, per 100 lbs.		
E	8.35—	
F	8.50—	
G	8.70—	
WW	8.95—	
Rosin (Wood), carlots	7.45—	
Salt Cake—		
Dom. bulk (wks) ton	24.00	to 28.00
Imp. bulks on dock—(Atl. ports) ton (Nom.)	25.00	to ——
Soda Ash—		
Bulk (works), cwt.	1.10	to 1.20
Paper Bags, cwt.	1.30	to 1.40
Barrels, cwt.	1.70	to 1.80
Soda (Caustic)—		
Solid drums, cwt.	2.90	to 3.10
Ground and flake, drums, cwt.	3.25	to 3.50
Sodium Silicate—		
60 deg., 55 gal. drums, (works) cwt.	1.65	to 2.05
40 deg. 35 gal. drums, (works), cwt.	.80	to 1.45
Starch—		
Pearl, 140 lb. bags, cwt.	5.41—	
Pearl, barrels, cwt.	5.41—	
Paper, (Sp.) bags, cwt	5.41—	
Powdered, barrels, cwt.	5.52—	
Sulphur (Crude)		
(Mine) bulk, long ton	16.00	to 18.00
Talc—		
Dom. 100 lb. bags (mine) ton	22.00	to 28.00
Canadian	35.00	to 45.00
Titanium Dioxide—		
Barium Pig, bbls., lb.	18	to .18½
Calcium Pig, bbls., lb.	18	to .18½
Zinc Sulphide, bbls., lb.	11.50	to 11.75

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

Bleached sulphite, Swedish.	165.00—
Bleached sulphite, Finnish.	165.00—
Bleached sulphite, dom.	126.00 to 135.00
Easy bleaching sulphite	—
Unbleached sulphite, Swed.	140.00 to 145.00
Unbleached sulphite, Fin.	140.00—
Unbleached sulphite, dom.	125.00 to 130.00
Unbleached kraft, Swedish.	127.50—
Unbleached kraft, Finn.	127.50—
Unbleached kraft, northern.	120.00 to 125.00
Unbleached kraft, southern.	110.00 to 125.00
Bleached sulphate, Swedish.	165.00—
Bleached soda, domestic	130.00 to 135.00
Sulphite screenings, dom.	60.00 to 70.00
Sulphate screenings, dom.	60.00 to 70.00
Groundwood, domestic and Canadian	80.00 to 85.00

PAPER

f.o.b. New York City

Boards—	per ton
Binders	94.00—
Chip	85.00—
Chip, tube and can	90.00—
Chip, full blending	92.50—
Chip, sgl. mla. lined	90.00—
Coated, white patent .016	120.00—
.020 and heavier	110.00—
Kraft liner	79.00—
Filled News	90.00—
Container	90.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	14.85—
B Grade E. F.	14.55—
A Grade S. C.	15.35—
B Grade S. C.	14.95—
No. 2 Uncoated Offset 4 sides. White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	20.15—
No. 2 Glossy	18.90—
No. 3 Glossy	18.25—
No. 4 Glossy	—
No. 2 Offset	14.60—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—	per cwt.
(In Ton Lots)	
Extra 100% Rag	52.30—
100% Rag	46.30—
75% Rag	36.70—
50% Rag	29.50—
25% Rag	26.35—

Rag Content Ledger—	per cwt.
(In Ton Lots)	
Extra 100% Rag	50.50—
100% Rag	44.50—
75% Rag	36.70—
50% Rag	29.50—
25% Rag	26.25—

Sulphite Bond—	per cwt.
Air dry, watermarked	–
No. 1 watermarked	18.50—
No. 2 watermarked	17.55—
No. 4 watermarked	16.85—

Sulphite Ledger—	per cwt. Zone 1
No. 1 watermarked	18.85—
No. 2 watermarked	18.05—
No. 4 watermarked	17.35—

Glassine (f.o.b. mill)—	per cwt
Embossed (25 lbs. up)	–
Bleached (25 lb. up)	–
Unbleached (25 lb. up)	–
Greaseproof— Bleached (25 lb. up)	–
Unbleached (25 lb. up)	—

News—	per ton
Rolls, Standard (Contract)	100.00—
Rolls (Spot)	(Nominal)
Sheets	119.00—

Tissues (Carlots)—	per ream
White No. 1	1.85—
White No. 2	1.75—
Bleached Anti-Tarnish	–
Colored	–
Anti-Tarnish Kraft	1.85—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M. shts.) per cs.	8.75 to 10.00
Toilet, Unbleached (M. shts.) per cs.	7.50 to 10.00

Towels—	per case
Bleached	4.75—
Unbleached	4.00—

Wrappings (Kraft)—	per cwt.
Super-Standard	9.00 to—
No. 1 Wrapping	7.50 to 8.00
Standard Wrapping	7.00 to 7.25
Standard Bag	6.50 to 7.00
Variety Bag	–

Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b. mill)

Bleached Papers—	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only (10,000 lbs.)	–
Drug wrapp., 35 lb.	–
Unbleached Papers—	
Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	–
No. 1 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	–
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite, 30 lb.	–
Steam Finish, 50 lb.	–
Water Finish, 50 lb.	–
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	–
Envp. Mla., Sub. 16-28 (No. 2)	–
Envp. Mla. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	–
No. 2	–
M.G. Sulphite and Kraft (other than Waxing)	
Grade B20 lb.	–
Grade A-22 lb.	–

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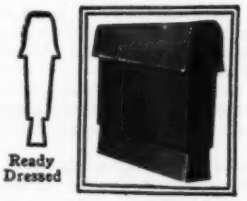

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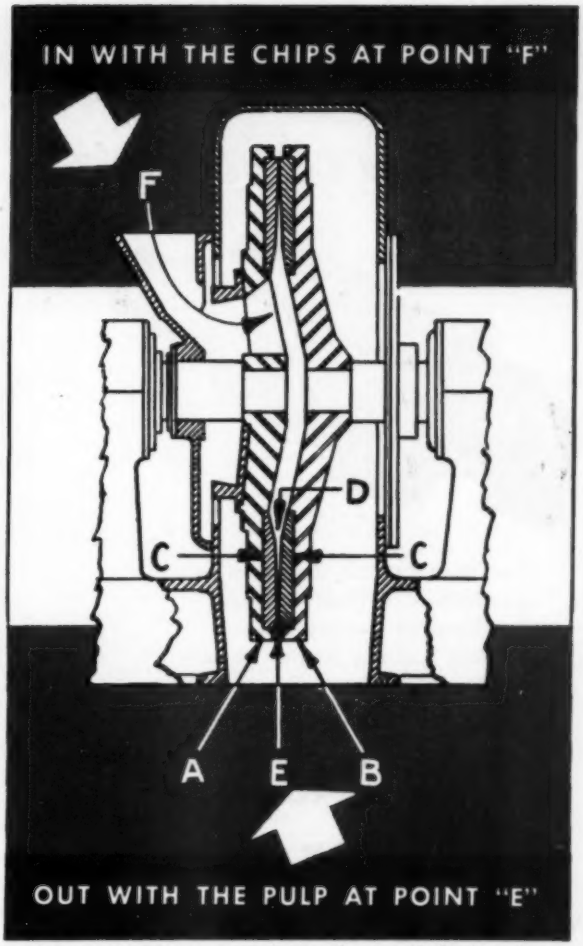

Chips enter at "F", pass at "D" between the renewable fiberizing plates "C", attached to the oppositely rotating discs "A" and "B", and the pulp is discharged at "E".

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Boxboard mills are installing Bauers to pulp furniture scrap, hogged chips, and other hard and soft waste. Hard wood is being reduced as fast, as thoroughly, and as uniformly as softer woods such as spruce and pine.

If you have access to hard wood material, you can use Bauer pulpers to great advantage.

"CHIPS GO IN, PULP COMES OUT"

THE BAUER BROS. CO.
SPRINGFIELD, OHIO

● Built in 24" and 36" sizes
Plate patterns as required

"Where Good Connections Count"

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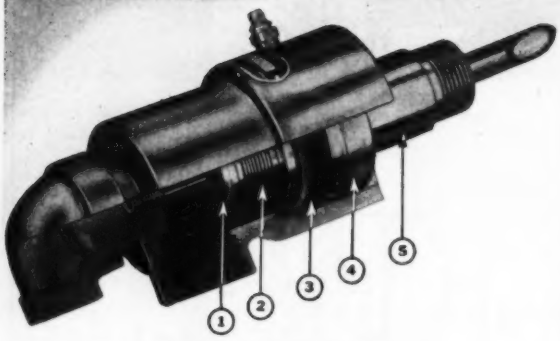

1—Silver Brazed Construction
2—Bellows of Heavy Monel
3—Graphite Sealing Ring
4—Ball Bearing Radial Thrust
5—Shaft of Heavy Steel

AVAILABLE IN PIPE SIZE FROM 1/2" TO 3" IN PLAIN OR SYPHON TYPES FROM STOCK

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WILL DO A BETTER SEALING JOB ON YOUR PAPER MAKING MACHINERY
DRYERS ★ CALENDERS
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STAINLESS STEEL CASTINGS
for all equipment exposed to corrosion by sulphite acids or other corrosive agents
MICHIGAN STEEL CASTING CO., DETROIT 7, MICH.

Toilet Roll and Towel Roll Wrapping Machines
Write for complete information
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Managers and superintendents for board and sulphite mills, also mills making bonds, ledger, envelope, writing, specialty and tissues.

Resident engineer or plant engineer for large mills, salary up to $15,000 year; master mechanic experienced in corrugated box plant, also master mechanics for paper mills, designers and draftsmen; chief power plant engineer.

Paper maker with technical education; envelope salesmen; chemists and chemical engineers; purchasing agents for paper and pulp mill in Canada, also purchasing agent for woodlands and forests.

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294 Washington St., Boston 8, Mass.

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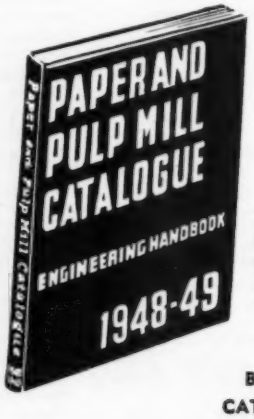

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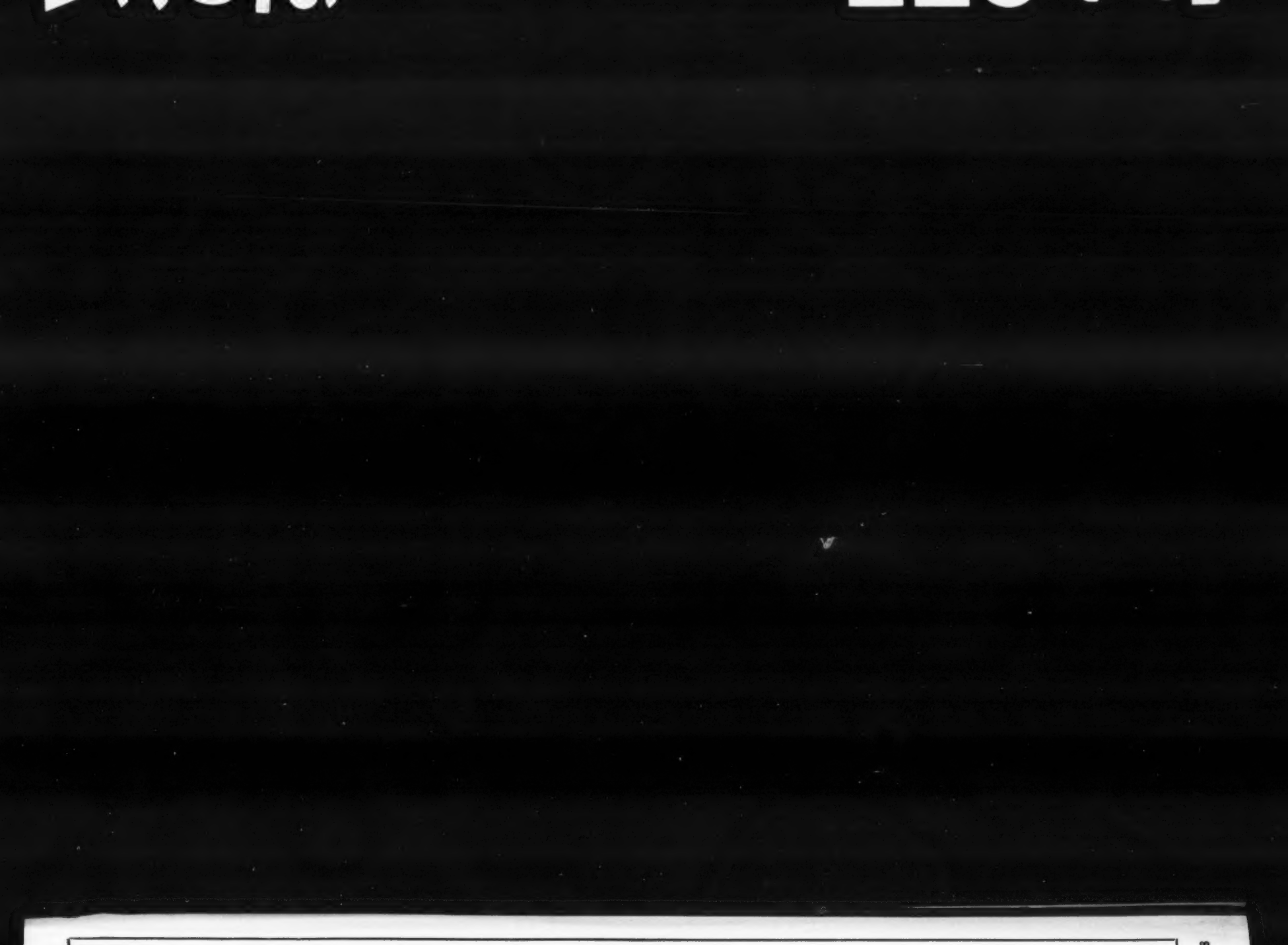


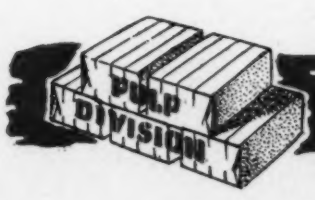
THIS IS PRE-LOGGING

Pre-logging is the harvesting in advance of smaller trees which otherwise would be damaged or destroyed if left until the big trees are logged. This isn't as simple as it sounds. To pre-log efficiently meant devising special new and mobile logging equipment.

However, the effort is justified in the recovery of many cords per acre of good clean material, highly desirable in the manufacture of sulphite or sulphate pulp.

Pre-logging fits into the method of "block" harvesting as used in the Douglas fir region, where forest lands are clearcut in a patchwork pattern, leaving blocks of seed trees as a source of regeneration. This is all part of the cycle of growth, harvest and regrowth known as Tree Farming.

Weyerhaeuser's use of the pre-logging method is another step toward more complete utilization of the timber crop.



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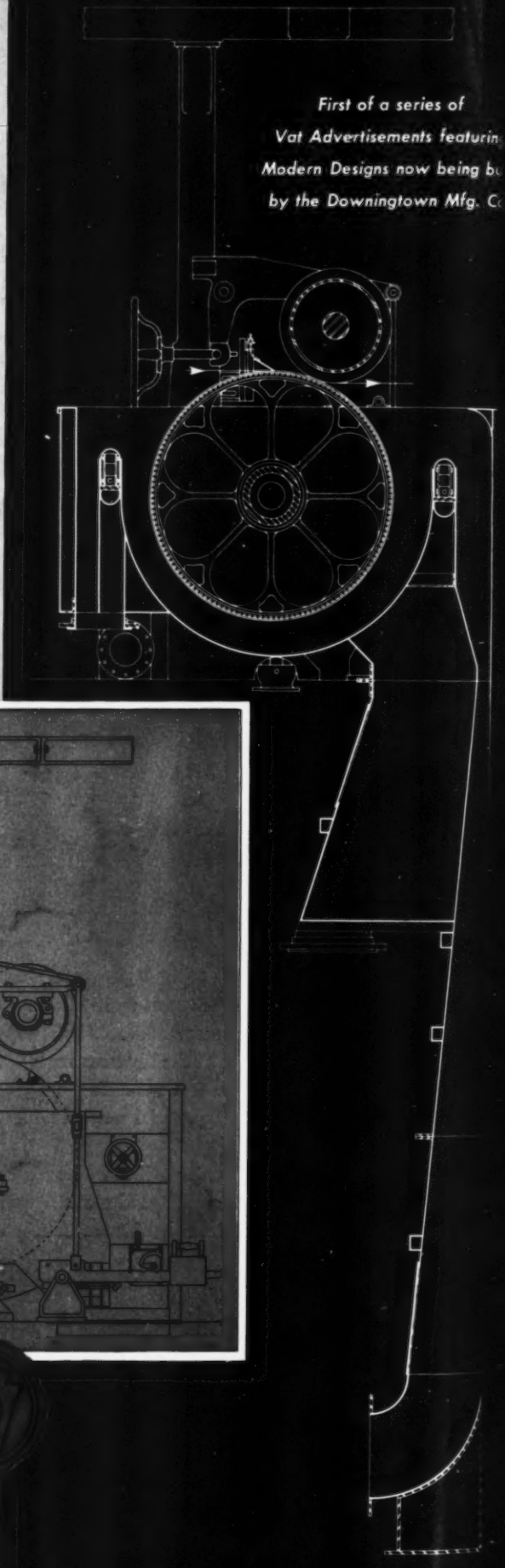
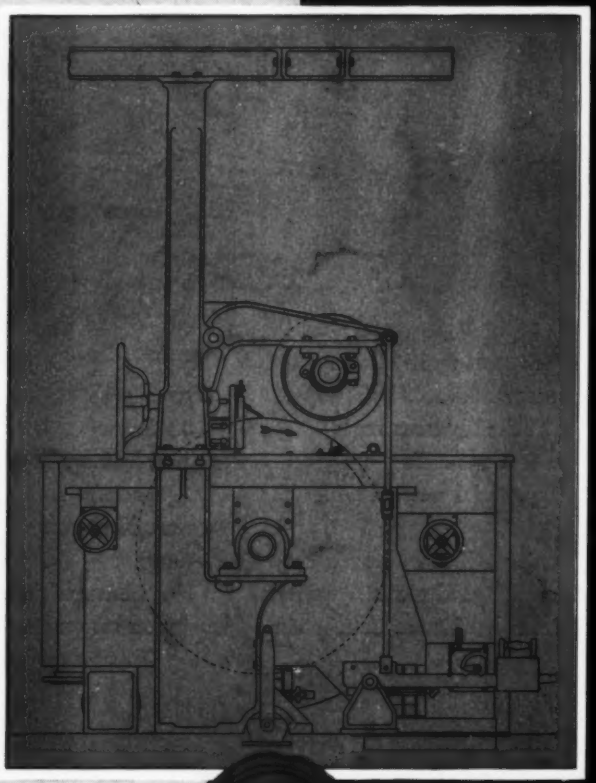


This modern design of Downingtown Vat is "all stainless steel," including the stock inlet and white water outlet and, as its name *PROFLOW** indicates, direction of stock flow is with the rotation of the cylinder mould. The vat has an Adjustable Making Board and an Adjustable Overflow. Leakage between the cylinder mould and the vat ends is prevented by a new design of Special Chime Ring Sealing Strap. Couch Roll is arranged for weighting or counter-weighting and both the Couch and Cylinder Mould are mounted in anti-friction bearings. Pedestal Mounts are provided to take the weight of the mould, bearings, couch, felt rolls, etc., supporting the load from the floor, with no strain on the vat. Vat is designed with ample clean-out facilities. Production of a well formed sheet of even weight and caliper is assured and proved by numerous recent installations. Write for more information.



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